II. ALTERNATIVES

A. ACTIONS CONSIDERED TO ADDRESS ISSUES IDENTIFIED IN SCOPING

Consistent with the National Environmental Policy Act (NEPA), issues identified in the scoping process were evaluated to determine the proper focus of the EIS. The NEPA regulations at 40 CFR 1501.7(a) provide that "significant" issues be identified and analyzed in depth while eliminating from detailed discussion issues which are not "significant." The focus of this EIS is therefore directed toward those issues that relate to the purpose and need of the EIS and are truly "significant" or important. The term "significant issues" is different from the criteria for significance of impacts, and refers to those issues that truly contribute to environmental impacts associated with the actions proposed in the EIS. Simply stated, the significant issues should be important to the decisions to be made. [Environmental Planning Strategies, Inc., 1998.]

The issues identified in scoping and set out in Chapter I.D.2, as well as the additional issues identified and discussed in Chapter I.E., were jointly evaluated. In evaluating the issues, the agencies reviewed their existing statutory and regulatory controls, policies, guidance and decision-making process to determine if the existing regulatory environment provided the mechanisms necessary to accomplish the purposes of this EIS. The purpose of this EIS is:

> "...to consider developing agency policies, guidance, and coordinated agency decision-making processes to minimize, to the maximum extent practicable, the adverse environmental effects to waters of the Unites States and to fish and wildlife resources affected by mountaintop mining operations, and to environmental resources that could be affected by the size and location of excess spoil disposal sites in valley fills." [64 FR 5778]

A description of the applicable statutes and regulations along with reviews of the requirements related to the EIS issues are in Appendix B.

1. Programmatic Review

During the programmatic reviews, the agencies considered the issues raised by the public and interested parties during scoping and "brainstormed" actions the government might take to better coordinate the programs to minimize impacts of mountaintop mining and valley fills. The "significant issues" were then identified in the scoping process, potential actions to address these issues were developed, reviewed, and prioritized in order to determine which actions would be effective and practicable for purposes of this EIS. Each issue raised in the scoping process [Chapter I] was considered to determine if actions could be taken to better coordinate the regulatory programs and to minimize environmental impacts of mountaintop mining and valley fills. The over 400 ideas for potential actions resulting from this process were organized and consolidated into approximately 130 ideas for government actions. In December 1999, these ideas were compiled in an outreach document and posted on the EPA Region III web site [http://www.epa.gov/region03/mtntop/documents.htm] as well as distributed to hundreds of stakeholders throughout the EIS study area [Appendix A].

Stakeholders provided reviews and comments on the 130 ideas; ranked the various ideas as high, medium, or low priority; and provided additional ideas. Ideas similar in nature were combined into common categories. Some ideas and comments were not developed into potential actions because they:

- were not related directly to the purpose and need of this EIS;
- were adequately covered by existing regulatory programs;
- would not be feasible under existing agency authorities and unlikely to be authorized by Congress in light of existing case law, statutes, or constitutional guarantees such as individual property right protections;
- were beyond the scope of the EIS because they would affect regulatory areas outside of the steep slope mountaintop coal mining focus of this EIS and could not be properly considered or analyzed; or
- were too vague or general to be analyzed, or would not provide substantial improvement in addressing the "significant issues" as required by NEPA.

Other suggestions were initially included for analysis but were ultimately not supported by the findings of the various technical studies, symposia, and existing literature reviews.

The result of this outreach effort was that the 130 ideas for government actions were further consolidated into approximately 60 actions, which were then assessed for appropriate inclusion in the EIS alternatives. Each of the actions was reviewed to select those that could significantly improve existing regulatory programs and realize greater environmental benefit regarding environmental impacts of mountaintop mining and valley fills in the study area. The 60 actions were then categorized into the following four topics: coordinated decision making, improved aquatic habitat protection, improved terrestrial habitat protection, and enhanced land uses.

The 60 suggested actions were evaluated, prioritized, and described. The final actions discussed in this EIS, which may be groups of suggested actions, were considered in various combinations in formulating the alternatives. As a result of this effort, 17 actions and three alternatives were developed and carried forward for analysis in this EIS. These actions and alternatives are described and evaluated in Section II.C of this chapter.

2. Technical Studies

To assist in the review of the existing regulatory environment, the agencies conducted or commissioned over 30 studies of the impacts of mountaintop mining and associated excess spoil disposal valley fills. The findings of these studies, along with the joint agency review of the existing regulatory environment, form the basis upon which the significance of each issue was evaluated. Many of the study findings are contained in Appendices D, E, G and H or referenced as to availability of information through other agencies or authors. Some studies were conducted by individuals and agencies outside of the EIS development process. Opinions and views expressed by the individual authors of these studies were not altered. Their opinions and views do not necessarily reflect the position or view of the agencies preparing this EIS. These studies are grouped into four general categories (aquatic, terrestrial, socio-economic and engineering). Cover sheets to summarize the studies were developed for each of the four appendices. These cover sheets are an aid to the reader and do not necessarily reflect the opinions and views of the EIS agencies.

Table II.A-1
MTM/VF EIS Technical Studies

Category	Study Short Title (preparer)	Date/Availability
Streams/Aquatic Information	WV-Macroinvertebrate (EPA)	November 2000; Appendix D
	WV Benthic Survey (OSM)	November 2002; Appendix D
	WV-Chemistry (EPA)	April 2002; Appendix D
	KY-Macroinvertebrate (EPA)	October 2001; Appendix D
	Fisheries (Penn State)	October 2002; Appendix D
	Statistical Analysis (EPA)	April 2002; Appendix D
	Ephemeral, Intermittent, Perennial Segments (USGS)	May 2003; Appendix D
	Wetlands	November 2001; Appendix D
	Headwater Streams Workshop	April 2000; Appendix D
	Aquatic Ecosystem Enhancement Symposium	May 2000; Appendix D CD of proceedings; available from DOE–NETL
Terrestrial, Soils Information	Birds, Small Mammals, Herptiles (WVU)	September 2002; Appendix E
	Birds along Forest Edge (Concord College)	May 2002; Appendix E
	Natural Succession/Plants (Rutgers)	October 2002; Appendix E
	Soil & Forest Productivity (OSM)	October 2002; Chapter III.B.4
	Mine soils (WVU)	January 2001; Appendix E

Category	Study Short Title (preparer)	Date/Availability
Extent of Potentially Surface- Minable Coal Resources	Extent of Surface-minable Coal Resources above the Coalburg Horizon in West Virginia (WVGES)	April 2000; Chapter III.O.
	Extent of Surface-minable Coal Resources in Three Eastern Kentucky Horizons (KGS)	July 2000; Chapter III.O.
	Extent of Surface-minable Coal Resources in Five Horizons in Southwestern Virginia (VPI)	July 2000; Chapter III.O.
Fill Stability	Fill Stability (OSM)	March 2002; Appendix H
Mining Reclamation Technology	Symposium	January 2000; Appendix H CD of Proceedings available from DOE--NETL
	Mine Tech Team Ephemeral Fill Restriction	July 2000 CD; Appendix G
Flooding/Fill Hydrology	Post-2001 WV Flood Analysis (USGS)	USGS draft Publication dated 2003; Appendix H
	COE/OSM Modeling	April 2001; Appendix H
	Ballard Fork Rainfall/runoff Model (USGS)	USGS draft Publication dated 2003; Appendix H
	Stream Geomorphology, Substrate, Flow, Temperature Survey (USGS)	USGS Publication IR 01-4092 dated 2001; available from USGS; Appendix D
Post Mining Land Use	Clarke Urban Growth Model land development potential and GIS analysis(WVU)	February 2002; Appendix G
Cumulative Impact Study	GIS modeling (EPA/Gannett Fleming Inc.)	December 2002; Appendix I
Blasting	Mine Dust/Blast Fumes (WVU)	October 2001; Appendix G

Category	Study Short Title (preparer)	Date/Availability
	Citizen Complaint Survey (OSM)	July 2002; Appendix G
	Non-Traditional Structures (OSM)	April 2002; Executive summary in Appendix G
	Wells (OSM)	June 2002; Executive Summary in Appendix G
Economics	Phase I-RTC	March 2002; Appendix G
	Phase II and Sensitivity Analysis-Hill & Associates	December 2001 and January 2003; Appendix G
	Community Impact/Demographic Changes (Gannett Fleming/EPA)	August 2002; AppendixG

3. Disposition of the Issues

The issues identified during the scoping process were evaluated and assigned to one of two categories. The first category contains those issues that were determined to be "significant issues" and actions were proposed to address them. The proposed actions addressing these Category 1 issues are described and evaluated in Chapter II.C. The consequences of these actions are analyzed in Chapter IV.

The "significant issues" in Category 1 are the following:

- Government Efficiency
- Direct Stream Loss
- Stream Impairment
- Fill Minimization
- Assessing and Mitigating Stream Habitat and Aquatic Functions
- Cumulative Impacts
- Deforestation
- Air Quality
- Flooding
- Threatened and Endangered Species

The second category contains issues that were considered not to be "significant issues", or that were considered significant but were already addressed by existing programs, regulations or laws. These issues do not have proposed actions and were not evaluated as part of the alternatives. The Category 2 issues (see Chapter I.D.2) are addressed as follows:

a. Blasting

Public comment during scoping indicated that MTM/VF blasting could impact individual homes, residents, and quality of life The agencies reviewed existing CWA and SMCRA regulatory requirements relevant to evaluation of the impacts that MTM/VF blasting operations. Studies related to these issues were also commissioned. Study topics included blasting vibrations and air concussion, well impacts, and a citizen complaint review. The complaint review consisted of an examination of the portion of a national blasting complaint survey that pertained to the EIS study area.

The regulatory review and study conclusions confirmed that existing regulatory controls provide adequate protections from coal mining-related blasting impacts on public safety and structures including wells. Findings further indicate the existing regulatory programs are intended to ensure public safety and prevent damage rather than eliminate nuisances from coal mine blasting activities. Some blasting within legal limits may still constitute a nuisance to people in the general area. As with all nuisances, the affected persons may have legal recourse regarding blasting nuisances through civil action. Consequently, blasting is not considered a "significant issue" and no actions are considered in this EIS. Existing blasting controls are discussed in Chapter III and Appendix B; study findings are in Appendix G.

b. Land Use

Concerns for viable post-mining land uses were expressed during the scoping. The agencies reviewed existing COE and SMCRA regulatory requirements relevant to evaluation of post-mining reclamation and potential use of mountaintop mine sites following reclamation. A study was commissioned related to this issue (Appendix G: Post Mining Land Use Assessment–Mountaintop Mining in West Virginia). The regulatory review and study indicate that existing regulatory controls are adequate to address this issue. Certain program controls relative to post mining land uses are discussed in Chapter II.C.

c. Scenery and Culturally Significant Landscapes

Statements provided during scoping indicated concerns about the effects of MTM/VF on scenery and culturally significant resources. Moreover, NEPA Section 102(2)(B) requires Federal agencies to "insure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making." [42 U.S.C. 4321] Existing regulatory programs afford the opportunity to address this issue either independently or through public comment. For example, SMCRA regulatory requirements and procedures provide the option for designation of lands unsuitable for mining on the basis of these values. COE actions can also include NEPA and public interest reviews that consider this issue [33 CFR 325.3(c)]. Another example of SMCRA protections requires that potential impacts to public parks, designated scenic rivers, and historic/cultural sites listed on or eligible for listing on the National Historic Register be considered and appropriate measures taken to prevent impacts to these resources [30 U.S.C. 1271]. In addition, the National Historic Preservation Act includes considerations of this issue [16 U.S.C. 470 et seq.]. Statutory and regulatory controls exist that address this issue. Moreover, actions contemplated within this EIS could reduce landscape impacts (e.g., address reforestation, fill minimization and cumulative impacts).

Exotic or Invasive Species – Commenters expressed concern that exotic and invasive species pose a threat to the natural ecosystem as they may out-compete and displace native species, reduce available food and habitat for wildlife, and change natural areas in terms of composition, structure, or ecosystem function. On February 3, 1999, Executive Order 13112 (E.O.) was issued to discourage the introduction of invasive species and provide for their control to minimize the economic, ecological, and human health impacts that invasive species cause [http://www.invasivespecies.gov/laws/execorder.shtml]. E.O. 13112 requires each Federal agency whose action may affect the status of invasive species to the extent practicable and permitted by law to undertake the following:

- identify such actions;
- subject to available appropriations and budgetary limits, use relevant programs and authorities to:
  - prevent the introduction of invasive species;
  - detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner;
  - monitor invasive species;
  - provide for restoration of native species and habitat conditions in the ecosystem that have been invaded;
  - conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control; and
  - promote public education on invasive species and means to address them; and
- not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the benefits of the actions clearly outweigh the potential harm caused by the invasive species.

The SMCRA regulations require that mine sites be reclaimed with vegetation that is diverse, effective, and permanent [30 CFR 816.111] . This vegetation can be comprised of native species or introduced species where desirable and necessary to achieve the approved post-mining land use. In addition to a review of the existing COE and SMCRA regulatory requirements and procedures relevant to the use and potential spread of exotic and invasive species associated with reclamation of mountaintop mine sites, the EIS action agencies commissioned a study [Appendix E: Terrestrial Plant (Spring Herbs, Woody Plants) Populations of Forested and Reclaimed Sites]. This study included a review of the use and occurrence of introduced invasive species on reclaimed mountaintop mining sites. The study also indicated the following: 1) species that may be considered exotic may be introduced in mining reclamation but their spread to other areas may be limited by surrounding forests and remoteness from other disturbed lands; and 2) the remoteness of MTM/VF sites typically limits the spread of invasive species to these sites.

Based on the review of this study and applicable SMCRA regulations, it was concluded that this was not a "significant issue" as related to MTM/VF. No additional actions are warranted. However, actions contemplated within this EIS could reduce the likelihood of the introduction of exotic and invasive species.

d. Valley Fill Stability

Some comments received during scoping indicated a concern over the long term stability of valley fills. OSM, in cooperation with the state SMCRA authorities in Kentucky, Virginia, and West Virginia, undertook a study to identify valley fills in the EIS study area and determine if stability of fills within this area was a "significant issue". The fill stability study is presented in Appendix H and discussed in Chapter III.K.1.C. This study concluded that no systemic evidence of area wide fill stability problems existed. The study identified very low occurrences of stability failures, and those identified failures were generally minor in nature and posed no risk to public safety.

e. Economics

The agencies commissioned studies to address economic impacts of MTM/VF in the EIS study area based on comments received during scoping. The economic studies are summarized in Appendix G (Phase I and Phase II Economic Studies). The studies indicate that the economic relationships existing among the coal industry, income, employment, taxes, electricity costs, and coal prices can be significant issues in the EIS study area. The actions proposed could affect the cost of mining application preparation, review, reclamation, and mitigation, and the cost of coal and electricity, due to the increased cost of mining. The actions and alternatives could have economic implications for the budgets of the regulatory agencies because of the need to add staff qualified to perform additional review and inspection functions. Economics are not analyzed as a separate issue in this EIS, but rather as consequences of the proposed alternatives in Chapter IV, consistent with NEPA.

f. Environmental Justice

Public comments received during scoping raised concerns of the impacts of MTM/VF on the local communities. E.O. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,"[http://www.fs.fed.us/land/envjust.html] requires Federal agencies to identify and address, to the extent practical and appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, or activities on minority or low-income populations. The agencies evaluated effects of existing regulatory programs, policies, and activities related to mountaintop mining and valley fills and commissioned studies on the issues of environmental, socio-economic, and quality-of-life impacts of mountaintop mining. The agency reviews and studies confirmed that these issues are significant as they contribute to the impacts associated with the proposal and are therefore important to the agencies decisions.

Under NEPA, if such effects are identified, agencies should give appropriate consideration to alternatives, mitigation measures, monitoring needs, and preferences expressed by the affected communities or populations [http://ceq.eh.doe.gov/nepa/regs/ej/ej.pdf]. Environmental justice is discussed in Chapter IV.

B. SUMMARY OF ALTERNATIVES CARRIED FORWARD

This section provides brief explanations of the four alternatives in the EIS, highlights proposals analyzed in the action alternatives, and discusses environmental and regulatory benefits of the alternatives. Also included are tables comparing and illustrating the major differences of the alternatives [Tables II-1, II-2]. Section II.C includes a detailed analysis, by issue, of the proposed actions, together with an overview of how the regulatory programs work today (i.e., the No Action Alternative) and how they would work under each of the other action alternatives.

The following alternatives, in conformance with the stated EIS purpose and need, include actions to improve and integrate regulatory programs dealing with MTM/VF. Each proposed alternative would improve environmental protection and better coordinate implementation of CWA and SMCRA, as compared to the No Action Alternative. Environmental benefits similar to those anticipated from the proposed alternatives, discussed below and in Chapter IV, were partially achieved through recent regulatory changes in West Virginia and changes by the COE to NWP 21. Under the proposed action alternatives, benefits similar but more expansive than those in the No Action Alternative would accrue in Kentucky, Tennessee, and Virginia. This would occur because implementation of the Federal programs would be more consistent across all states in the EIS study area. All three proposed action alternatives would better achieve the administrative mandate of the agencies to minimize duplication among the various Federal regulatory programs [30 U.S.C. 1211(c)(12), 30 U.S.C. 1292(c), 30 U.S.C. 1303(a), and 33 CFR 322.2(f)(2)].

The alternatives were developed with the objective that each would satisfy the requirements of the CWA and SMCRA. Overall, the fundamental regulatory framework of these statutory and regulatory objectives share many similarities. Both statutes require an applicant to:

- identify the environmental resources on the proposed site;
- predict the project impacts on those resources;
- avoid and minimize impacts to high-quality environmental resources;
- develop a compensatory mitigation plan to offset unavoidable aquatic impacts;
- demonstrate that the proposal is the least damaging, practicable option; and
- develop a plan that meets design and performance standards.

The regulatory authorities review the above information and analyses provided by the applicant and approve the plan if it meets the performance standards of SMCRA and CWA. Following approval, the applicant must perform certain monitoring obligations during mining and reclamation to verify that operations are conducted in accordance with performance standards and permit conditions. Monitoring by the applicant and inspection by the regulatory authorities reveal if impacts exceed predicted levels and documents that reclamation/mitigation are successful. The regulatory processes provide for public participation and appeal of decisions during all stages of application, operation, and reclamation. Various checks and balances also exist for interagency oversight, coordination, and consultation. Interaction and oversight responsibilities, coupled with the inspection and enforcement process, are important components in an effective regulatory structure.

Each proposed action, explained in Chapter II.C, is related to the various components of the regulatory process just described. The following are examples of the benefits of the proposed actions:

- Improved environmental protection through better information and analysis and collaborate government regulation.

- Improved government efficiency in implementing programs to achieve coordinated data collection/sharing and application processing that fulfill these objectives:
  - assure adherence to performance standards;
  - eliminate duplication; and
  - provide for public participation.

- Improved data collection to accomplish the following:
  - identify environmental resources;
  - monitor impacts based on changes from baseline condition; and
  - demonstrate compliance and/or reclamation/mitigation success.

- Improved prediction of impacts based on better data and analysis.

- Clarified regulatory concepts in the regulation of surface mining operations that accomplish these goals:
  - provide clear expectations to stakeholders for making decisions;
  - improve environmental protection; and
  - assure public safety.

- Expanded best management practices in mining, reclamation, and mitigation practices.

The proposed alternatives considered would better inform the public and provide more meaningful participation in part because plans would more thoroughly address impacts to environmental resources. The applicants would benefit from integrated regulatory programs under Federal environmental statutes for several reasons. Many of the actions are designed to facilitate streamlined, sequenced review processes while improving environmental protection. A coordinated review process could reduce processing times and costs of permit applications which may offset some of the increased costs and times associated with the additional data collection and analysis requirements of the actions. These actions also consider the program costs of Federally- versus state-administered application reviews, inspection, and enforcement. Each alternative would support efficient, environmentally responsible production of energy resources, and would help clarify environmental performance standards for stakeholders and regulators. Likewise, each action alternative would lead to more complete permit information as a better basis for regulatory decisions.

Table II.B-1
Mountaintop Mining/Valley Fill EIS Alternatives Summary

"No Action" Alternative	Maintains the regulatory programs, policies, and coordination processes that exist in 2003.
Alternative 1	The COE CWA Section 404 program will be the primary regulatory program for determining (on a case-by-case basis) whether and how large valley fills from MTM/VF would be allowed in waters of the U.S. The COE would procedurally presume that most projects would require the CWA Section 404 IP process and NWP 21 authorization would be applicable in limited circumstances. The COE would perform requisite public interest review as well as appropriate NEPA analysis. As part of the IP process, the COE would largely rely on SMCRA reviews that adequately address terrestrial and community impact issues arising as part of public participation. COE authority for mitigation of unavoidable aquatic impacts will be required to less than significant levels, either by on-site replacement of aquatic functions or by in-kind, off-site watershed improvement projects within the cumulative impact area. The COE would be the lead agency for ESA consultation on aquatic resources and the SMCRA agencies would coordinate with FWS on aquatic and terrestrial species. All other regulatory programs would defer to or condition decisions on attaining the requisite CWA Section 404 approvals. OSM would consider rule-making so the stream buffer zone is inapplicable to excess spoil disposal in waters of the U.S. OSM would finalize excess spoil provisions to include minimization and alternative analysis more consistent with CWA. Cross-program actions include rule-making; continued research on MTM/VF impacts, improved data collection, sharing, and analysis; development of BMPs and ADIDs; and agency coordination established by an MOA and FOP (no joint application). These actions would serve to further minimize the adverse effects on aquatic and terrestrial resources and protect the public.
Alternative 2	This is the preferred alternative. The agencies would develop enhanced coordination of regulatory actions, while maintaining independent review and decision making by each agency. The size, location and number of valley fills allowed in waters of the U.S. would be cooperatively determined by CWA and SMCRA agencies based on a joint application and under procedures spelled out in an MOA, JPP, and FOP. OSM would apply functional stream assessments to determine onsite mitigation. OSM rules would be finalized to make the stream buffer zone more consistent with SMCRA and CWA. OSM excess spoil rules would be finalized to provide for fill minimization and alternatives analysis, similar to CWA Section 404(b)(1) Guidelines. The COE would make case-by-case decisions as to NWP or IP processing. Public interest review and NEPA compliance by the COE would occur for IPs and would be assisted, to the extent possible, by the SMCRA permit. Mitigation of unavoidable aquatic impacts would be required to the appropriate level. ESA evaluations for IPs mirror Alternative 1; the SMCRA agency would take the lead for ESA coordination for NWP 21. FWS retains the ability to consult on unresolved ESA issues for all CWA Section 404 applications. Cross-program actions include rule-making; improved data collection, sharing and analysis; development of a joint application, harmonized public participation procedures, BMPs, and ADIDs; and close interagency coordination. These actions would serve to further minimize the adverse effects on aquatic and terrestrial resources and protect the public.
Alternative 3	The COE would begin processing most MTM/VF projects as NWP 21 and few projects would require IP processing. The SMCRA program would be enhanced as described in Alternative 2 and the SMCRA regulatory authority would assume the primary role of joint application review. The COE, or a state through an SPGP, would base CWA authorizations largely on the SMCRA review with the addition of adequate offsite mitigation. The COE would require the IP process if its review found an application inadequate because of data collected, alternatives considered, or mitigation. Satisfaction of ESA would be identical to Alternative 1 and 2 descriptions relative to IP and NWP 21/SMCRA processing. The cross-program actions are identical to Alternative 2 with the exception of no ADID development.

1. Overview of the Alternatives

The features of the alternatives for this EIS are summarized below. Detailed explanations of these alternatives and actions are provided in Chapter II.C

a. No Action Alternative: The Regulatory Program Today

The No Action alternative, describing the SMCRA and CWA programs as implemented in 2003, is the baseline from which to compare all other alternatives. A more detailed description of the current regulatory program features can be found in Chapter II.C. Under this alternative, the agencies would continue to operate in West Virginia in a coordinated fashion using the interim permitting process required by the *Bragg* settlement agreement. The COE agreed in the *Bragg* settlement to establish the general condition in West Virginia that valley fills in watersheds less than 250 acres could be authorized by NWP 21. However, this threshold would eventually be replaced in West Virginia by the COE stream assessment protocol establishing chemical, biological, and physical characteristics for case-by-case determinations by the COE District Engineer whether to process CWA Section 404 applications as a NWP 21 or an IP. Processing an MTM/VF application as an IP for valley fills is subject to NEPA, and the COE prepares either an EA/FONSI or EIS. OSM is the SMCRA authority in Tennessee and, since SMCRA permitting in that state is a Federal action, NEPA requirements apply and are coordinated with the COE.

The interim permitting process resulted in a methodical evaluation of the SMCRA and CWA permit processes in relation to MTM/VF in West Virginia. The agencies developed flow charts, listed issues to address, and attempted to eliminate duplication where possible, emphasizing early interagency pre-application reviews and discussion. In addition, the agencies coordinated decisions in the most logical manner allowed under the existing program requirements. Federal and state teams developed guidance documents to address analysis of flooding potential, mitigation, NEPA compliance, etc.

The No Action Alternative does not foster the consistent, coordinated review process outside of West Virginia [see existing program coordination features in Chapter II.C.1.a]. However, the West Virginia interim permitting activity encouraged some level of Federal/state agency coordination in other states where MTM/VF occurs. For instance, workgroups of Federal and state regulatory agencies, as well as mining industry and environmental stakeholders, were formed in Kentucky and Virginia. Even though fully-coordinated review processes do not exist in all states, the COE performs case-by-case minimal impact determinations and mitigation for unavoidable aquatic resource impacts in all states [Chapter II.C.1.a, II.C.6.a.1]. Inter-district COE consistency is a result of the revised NWP 21, in effect since January 2002. In addition, COE Headquarters developed regulatory guidance addressing consistency for data collection, and impact analysis in all Districts reviewing MTM/VF applications.

Under the No Action Alternative, the SMCRA permit is typically processed first and issued relatively concurrent with the NPDES CWA Section 402 authorization by the states. COE issuance of the CWA Section 404 permit under NWP 21 and the state issuance of a CWA Section 401 water quality certification occurs following SMCRA approvals. A few permit applications have been processed as IPs, which requires the COE to perform a public interest review, alternative analysis and prepare detailed NEPA compliance documents. If an EIS is required, extensive review by the public and Federal and state agencies occurs. SMCRA application information about the terrestrial environment and control of other human-related impacts (e.g., blasting, embankment stability, roads,

hydrologic impact to water quantity or quality, etc.) is useful to the COE for both NEPA and the public interest review.

There have been no major programmatic changes from 1998 to the present for compliance with ESA, CWA Sections 401 and 402, NHPA, and other applicable laws and regulatory provisions. EPA and OSM oversight of CWA and SMCRA programs is a common feature of all alternatives considered by this EIS, including the No Action Alternative. The COE is responsible for requesting comments and consulting with the FWS and state fish and wildlife agencies in regards to Federally-listed T&E species and critical habitat in the aquatic environment. State SMCRA agencies will further consider potential upland impacts from MTM/VF on T&E species and habitat [Chapter II.C.11.a.]. Under all four alternatives, the FWS is responsible for reviewing and providing timely comments and suggestions to the COE and the appropriate SMCRA agency regarding the protection of Federally-listed T&E species.

A number of significant program improvements included in the No Action Alternative, accomplished while the draft EIS has been under development, are described below.

a.1. COE CWA Section 404 Program

The interim permitting process implemented following the *Bragg* settlement in West Virginia led the COE to take steps to consistently apply CWA Section 404 to MTM/VF project proposals in all COE Districts with jurisdiction over steep-slope Appalachia (Louisville, KY; Nashville, TN; Norfolk, VA; and Huntington, WV) [see Chapter II.C.6.a.1]. COE inter-District meetings to discuss the MTM/VF permitting process assisted in this regard. The COE agreed in the *Bragg* settlement to establish the general condition in West Virginia that valley fills in watersheds less than 250 acres could be authorized by NWP 21. Consequently, as of July, 2002, 81 proposals were eligible for NWP 21 in West Virginia and 5 were processed as IPs. The COE Huntington District has processed more than 160 NWP 21 permitting actions involving fills in West Virginia and Kentucky since the start of 1999. These CWA Section 404 permit numbers also partially reflect that, between mid-2002 and early 2003, the COE Huntington District was enjoined from approving fills without a "constructive purpose."

The COE/EPA promulgation of a final fill rule in May, 2002 eliminated discrepancies between EPA and COE definitions of "fill" [67 FR 31129-31143]. The COE renewed NWPs, including NWP 21, in January, 2002 [67 FR 2020-2094]. The COE District Engineer must make a specific determination on a case-by-case basis that proposed activity complies with the terms and conditions of the NWP 21 and that adverse effects to the aquatic environment are minimal, individually and cumulatively, after considering mitigation. In addition, the COE Louisville District began developing and validating a protocol for quantifying functions for stream segments where impacts are proposed.

The COE Louisville District collaborated with EPA Region IV, and the Kentucky state water quality agency to assemble the procedures for data collection and analysis to evaluate activities filling waters of the U.S. Use of the Louisville District protocol provides a numerical "score" for stream segments based on physical, chemical, and macro-invertebrate data collection. In addition to helping to determine the size, number and location of valley fills, the stream score is used to evaluate whether mitigation projects can offset unavoidable impacts by recreating stream functions on site

or improving stream functions off-site within the same watershed. The protocol is also a tool which can be used by the COE to determine whether a project is in compliance with the CWA Section 404(b)(1) Guidelines. This protocol is currently in use by the Louisville, Huntington, and Nashville districts in Kentucky and Tennessee. Calibration for West Virginia by the Huntington District and for Virginia by the Norfolk District is underway. Upon final validation, the protocol will be used in all COE Districts and become a standard tool for determining the size, number and location of valley fills and whether MTM/VF proposals can be processed under a NWP 21 or require an IP.

a.2. EPA CWA Section 402/404 Programs

The EPA, working with the other Federal and state CWA/SMCRA agencies, developed baseline data protocols for chemistry and biological monitoring in 1999-2000 [see Chapter II.C.4.a.]. These protocols were formalized for use in both Regions III and IV of EPA for mining proposals within the EIS study area. CWA program activities regarding development of total maximum daily loads (TMDLs) for impaired streams are widespread in the study area, as are development of state water quality criteria for anti-degradation, identification of impaired and high quality streams, and other provisions that will affect the ultimate approval of any "discharge of fill" in waters of the U.S. New mining impacts proposed in impaired streams undergo additional scrutiny as to the ability to improve existing water quality and other stream characteristics related to the overall integrity of a watershed. EPA and OSM, working with the states, established best management practices (BMPs) that would encourage remining and result in overall watershed improvements. The BMPs are discussed in the EPA rule-making on new effluent guidelines to reclaim abandoned mine sites. [http://www.epa.gov/ost/guide/coal/fsdec2001.html]

a.3. SMCRA Programs

Following OSM oversight review of state implementation of SMCRA requirements for AOC and post-mining land use in Kentucky, Virginia, and West Virginia, [http://osmre.gov/mtindex/htm]; and after WVDEP entered into the 1999 consent decree with *Bragg* plaintiffs, state SMCRA regulatory authorities began developing guidelines or policies for assuring that MTM excess spoil was demonstrably surplus of that needed for mine site reclamation. Most notably, WVDEP, with OSM assistance, developed the "AOC+ policy," requiring volumetric calculations and an engineering process to assure that excess spoil disposal resulted in the least stream impacts possible to conduct the project. Virginia, Kentucky, and the OSM Tennessee programs developed similar policies to minimize excess spoil, thus limiting valley fills. [Chapter II.C.5.a.2]

OSM issued a post-mining land use policy in June, 2000 clarifying the criteria for mine sites to qualify for non-AOC reclamation. This emphasis by OSM and the state SMCRA agencies on AOC requirements leads applicants to avoid streams and seek upland locations for spoil placement. The number and size of valley fills has been reduced due to this and other factors.

In 2002, OSM developed and issued guidance documents for managing hydrologic data that will aid in developing PHCs and CHIAs. Also during 2002, OSM held a workshop on PHC and CHIA requirements for states to share processes and improvements to enhance hydrologic data collection and analyses. OSM conducted oversight and research regarding blasting impacts and controls. Development of improved guidance manuals and advanced training on proper blasting design and evaluation is nearing completion. To encourage reforestation, OSM held a policy outreach

symposium in January, 1999 and technical interactive forums in March, 1999 and May, 2002. These efforts were intended to illustrate the benefits of reclaiming with trees, to identify regulatory impediments, incentives, and state-of-the-art soil handling and commercial forestry reclamation techniques.

OSM initiated a SMCRA regulatory program enhancement to amend and clarify the stream buffer zone (SBZ) rules at 30 CFR 816.57 and 817.57. The amended SBZ rule would more closely align with the principal statutory basis for the rule [30 U.S.C. 1265(b)(10) and (b)(24)]. As a complementary rule change, the excess spoil regulations will be changed to ensure that the volume of excess spoil is minimized and that excess spoil fills are constructed in a manner and location to cause the least environmental harm after the consideration of alternative designs and locations [Chapter II.C.5., Action 7].

WVDEP, working in a team with the COE and OSM, developed guidelines for consistent evaluation of flooding potential that are used in West Virginia. The FWS and OSM developed a training course for Federal and state staff to explain how to satisfy the coordination requirements under the FWS 1996 BO related to the protection of T&E species under the ESA. FWS retains consultation procedures regarding appropriate T&E species-specific protection plans with COE under Section 7 of the ESA. [Chapter II.C.11.]

b. Summary of Alternative 1: The Number, Size, and Location of Valley Fills in Waters of the U.S. would be Determined by the COE CWA Section 404 Permit Process.

The COE District Engineer would procedurally presume in Alternative 1 that most CWA Section 404 MTM/VF applications would be processed as IPs. The COE, on a case-by-case basis, would make the initial determination of the size, number, and location of valley fills in waters of the U.S. Under this alternative, all MTM/VF projects proposed in waters of the U.S. would initially be processed by the COE as an IP, rather than as a general permit, such as NWP 21. Following this initial determination, the applicant would commence the SMCRA and other requisite application processes (NPDES, MSHA, etc.). ESA concerns would initially be addressed by the COE. Alternative 1 would involve the COE evaluating these IPs with a 404(b)(1) Guidelines review, secondary and cumulative impact review, and the public interest review. [Chapter II.C.1.b, Action 1.1.] This alternative contrasts with the No Action Alternative as well as Alternative 3, under which most valley fills have been and would be authorized by NWP 21.

Alternative 1 would continue the OSM rulemaking currently underway to make the regulatory program more consistent with SMCRA and CWA provisions [Chapter II.C.5.a.2, Action 7]. OSM would also consider revising the SBZ rule at 30 CFR 816.57 as inapplicable to excess spoil disposal in waters of the U.S., based on deference to the COE analyses of the aquatic resource impacts [Chapter II.C.3.a.2, Action 3.1]. The SMCRA regulatory authority would retain its overall responsibility for regulating other SMCRA environmental and public safety aspects of mining operations. The result of this alternative would be a series of consecutive, coordinated reviews and decisions, formalized through an MOA and FOP, lead by COE with the appropriate SMCRA agency [Chapter II.C.1.b, Action 1.1]. EPA and FWS responsibilities for commenting on IP applications and EPA oversight authorities are unchanged.

Alternative 1 also contains a number of programmatic actions under CWA and SMCRA that would result in added environmental protection of streams, fish, wildlife, and other environmental values. These actions include development of Best Management Practices (BMP) manuals covering topics such as mitigation, fugitive dust and blasting fumes, flooding, and reforestation. The COE and EPA would also consider identifying high quality watersheds for special consideration. This alternative proposes to continue evaluating the effects of MTM/VF on stream chemistry and biology and further refine science-based protocols for assessing ecological function, making permit decisions, establishing mitigation requirements and, if necessary, developing water quality criteria. The T&E consultation and coordination process would be adjusted, if necessary to assure ESA compliance. The agencies would work together to: coordinate permit processing, mitigation project bonding, and inspection; develop consistent definitions of stream characteristics and delineations; and collect and analyze data to assess the feasibility of individual and cumulative impact thresholds. [Chapter II.C.1-11.]

c. Alternative 2: (Preferred Alternative) The Size, Number, and Location of Valley Fills in Waters of the U.S. would be Determined by a Coordinated Regulatory Process

Alternative 2 is unlike the other two action alternatives in that it integrates the SMCRA and CWA programs into a coordinated regulatory process to determine the placement of MTM/VF in waters of the U.S., while maintaining independent decision making authority among the agencies. The COE would initially decide the applicability of the IP process (in partial reliance on the SMCRA information provided by the applicant as part of a joint permit application); and determine CWA Section 404(b)(1) Guidelines and NEPA compliance for those applications determined to warrant IP processing (as described in Alternative 1). The COE would make case-by-case evaluations of site-specific impacts to determine the appropriate CWA Section 404 review process, in accordance with any NWP 21 regional conditions. Any regional conditions, such as an interim 250-acre minimal impact threshold for specific geographic areas, would continue to be implemented under this alternative until revoked or replaced. These regional conditions are described in the No Action Alternative [Chapter II.C.1.a.1.]. If the coordinated COE/SMCRA review process determined that an application could likely receive NWP 21 authorization, the COE would process the application following the SMCRA review (as described in Alternative 3). COE NWP 21 decisions would rely, to the greatest extent possible, on the SMCRA review. [Chapter II.C.1.c, Action 1.2.]

Selection of Alternative 2 could result in the resource agencies conducting more joint site visits to gather site-specific resource information and impact prediction to allow the COE to make a more informed decision regarding the use of discretionary authority. OSM would retain SMCRA authorities, including oversight of state agencies implementing SMCRA. In addition, OSM would continue rule making to adopt regulations to allow data collection, impact predictions, alternative analysis, fill minimization, and on-site mitigation considerations in consonance with the CWA Section 404(b)(1) Guidelines [Chapter II.C.3.a.2, Action 3.1; Chapter II.C.5.a.2, Action 7]. EPA and FWS responsibilities for commenting on IP applications and EPA oversight authorities are unchanged [Chapter II.B.1.a.]. ESA evaluations for IPs mirror Alternative 1; the SMCRA agency would take the lead for ESA coordination for NWP 21 as described in Alternative 3. FWS retains the ability to consult on unresolved ESA issues for all CWA Section 404 applications [Chapter II.C.1.c, Action 1.2].

The regulatory framework and process for this alternative would be embodied in an interagency Memorandum of Agreement (MOA) among the regulatory agencies with authorities under the SMCRA or CWA and their respective implementing regulations [Chapter II.C.1.c]. The MOA could set forth the joint permit process (JPP) in general, explain responsibilities and authorities of each agency in the process, frame the interagency decision making and dispute resolution procedures, and require the development of joint CWA/SMCRA Field Operating Procedures (FOP). A FOP could serve as the guidelines manual implementing the MOA and provide administrative and procedural details.

Further, the MOA could integrate and coordinate the regulatory programs under SMCRA and CWA to continue data collection to address identified gaps, to develop permit application assessment procedures and mitigation based on these data, to convene regular JPP meetings and to further refine and implement the COE stream assessment protocol in evaluating permit applications. The MOA could explain the preparation and dissemination of a public outreach brochure. The brochure would provide status reports related to the implementation of the selected alternative in this EIS and would therefore be updated as needed.

In addition, this alternative would provide for a single joint permit application for SMCRA and CWA authorization. The information submitted by the permit applicant would be distributed to the regulatory agencies according to their respective statutory authorities and responsibilities. For example, information and data relating to engineering aspects of the proposal such as slope stability, revegetation, blasting, and roads would still be reviewed principally by the SMCRA agency. Information relevant to both SMCRA and CWA authorization, such as fill minimization, upland alternatives, and compensatory mitigation would be jointly reviewed and evaluated. This would result in a streamlined application process and harmonized public participation.

Alternative 2 also contains a number of programmatic actions under CWA and SMCRA that would result in added environmental protection of streams, fish, wildlife, and other environmental values. These actions were previously described in Alternative 1 and are presented in Chapter II.C.1-11.

d. Alternative 3: The Size, Number, and Location of MTM/VF Valley Fills in Waters of the U.S. would be Determined by an Enhanced SMCRA Regulatory Program

The goal of this alternative would be to enhance the SMCRA programs to satisfy the informational and review requirements of the CWA Section 404 program in order to minimize, to the maximum extent possible, the adverse effects of MTM/VF and to create a more effective and efficient permit application review process. The principal difference between this alternative and Alternative 1 is that the enhanced SMCRA regulatory process, gained through rule-making, could provide the regulatory platform to ensure that MTM/VF in waters of the U.S. comply, to the extent allowed by the proposed rule-making, with CWA Section 404 program. This alternative differs from Alternative 2 which describes a coordinated interagency screening process to determine the type of COE CWA Section 404 permit needed for MTM/VF in waters of the U.S.

Alternative 3 is based on the concept of a procedural presumption by the COE that most MTM/VF applications would begin processing as NWP 21 because the SMCRA review is the functional equivalent of an IP, with the exception of off-site mitigation, which would be assured by the COE under CWA Section 404 review. Under this alternative, the SMCRA regulatory authority would be

the lead review agency, reducing duplication of CWA regulatory control exercised by the COE. This would meet the purpose of the general permit process envisioned by the CWA Section 404(e). However, unlike Alternative 1, ESA concerns could be addressed in the initial review under SMCRA, and that review may reduce the time required for FWS consultation with the COE on the CWA Section 404 permit as a Federal action. [Chapter II.C.1.d, Action 1.3.]

While the COE retains responsibility for authorizing CWA Section 404 permits, the information collected and analyzed by the SMCRA agency would allow the COE to process most permits under NWP 21. A state may assume control through a state programmatic general permit (SPGP) or through full assumption of the CWA Section 404 program [Chapter II.C.1.a.2]. The COE would also be responsible for mandating and retaining its jurisdiction for appropriate compensatory mitigation to offset unavoidable impacts to aquatic resources. Currently, unlike the COE, SMCRA agencies may not have the statutory basis to require off-site compensatory mitigation. Most states in the EIS study area require compensatory mitigation through either the CWA Section 401 water certification process or state water quality laws. Under this alternative, the SMCRA agency would work closely with the COE to determine the extent of on- or off-site compensatory mitigation needed to offset unavoidable adverse effects of MTM/VF to waters of the U.S.

Alternative 3 contains a number of programmatic actions under CWA and SMCRA that would result in added environmental protection of streams, fish, wildlife, and other environmental values. These actions were previously described in Alternative 1. Alternative 3 does not include development of ADIDs, but does include the development of a joint permit application, MOA, and FOP as described in Alternative 2.

2. Specific Actions Proposed by the Alternatives

a. Proposals Common to Action Alternatives 1, 2, and 3

The Federal and/or state agencies would cooperatively do the following:

- develop guidance, policies, or institute rule making for consistent definitions of stream characteristics as well as field methods for delineating those characteristics.
- continue to evaluate the effects of mountaintop mining on stream chemistry and biology.
- continue to work with states to further refine the uniform, science-based protocols for assessing ecological function, making permit decisions and establishing mitigation requirements.
- continue to assess aquatic ecosystem restoration and mitigation methods for mined lands and promote demonstration sites.
- incorporate mitigation/compensation monitoring plans into SMCRA/NPDES permit inspection schedules and coordinate SMCRA and CWA requirements to establish financial liability (e.g., bonding sureties) to ensure that reclamation and compensatory mitigation projects are completed successfully.
- work with interested stakeholders to develop a best management practices (BMPs) manual for restoration/replacement of aquatic resources.

- evaluate and coordinate current programs for controlling fugitive dust and blasting fumes from mountaintop MTM/VF operations, and develop BMPs and/or additional regulatory controls to minimize adverse effects, as appropriate.
- develop guidelines for calculating peak discharges for design precipitation events and evaluating flooding risk. In addition, the guidelines would recommend engineering techniques useful in minimizing the risk of flooding.
- based on the outcome of ongoing informal consultation, identify and implement program changes, as necessary and appropriate, to ensure that MTM/VF is carried out in full compliance with the Endangered Species Act.

The COE would:

- continue to refine and calibrate the stream assessment protocol for each COE District where MTM/VF operations are conducted to assess stream conditions and to determine mitigation requirements as part of the permitting process.
- compile data collected through application of the assessment protocol along with PHC, CHIA, antidegradation, NPDES, TMDLs, mitigation projects, and other information into a GIS database.
- use these data to evaluate whether programmatic "bright-line" thresholds, rather than case-by-case minimal individual and cumulative impact determinations, are feasible for CWA Section 404 MTM/VF permits.

The OSM and/or the state SMCRA regulatory authorities would:

- continue rule-making to clarify the stream buffer zone rule and require fill minimization and alternatives analysis.
- in conjunction with the PHC, CHIA, and hydrologic reclamation plan, apply the COE stream assessment protocol to consider the required level of onsite mitigation for MTM/VF.
- develop guidelines identifying state-of-the-science BMPs for selecting appropriate growth media, reclamation techniques, revegetation species, and success measurement techniques for accomplishing post mining land uses involving trees.
- if legislative authority is established by Congress or the states, require reclamation with trees as the post mining land use.

The EPA would:

- as appropriate, develop and propose criteria for additional chemicals or other parameters (e.g., biological indicators) that would support a modification of existing state water quality standards.

The FWS would:

- continue to work with Federal and state SMCRA and fish and wildlife agencies to implement the 1996 BO and streamline the coordination process.
- work with agencies to develop species-specific measures to minimize incidental takes of T&E species.

b. Actions Common to Alternatives 1 and 2

The Federal and/or state agencies would cooperatively:

- consider designating areas generally unsuitable for fill, referred to as Advanced Identification of Disposal Sites (ADID).

c. Actions Common to Alternatives 2 and 3

The Federal and/or state agencies would cooperatively:

- develop a joint MTM/VF application form.

The OSM would:

- continue rulemaking relative to the stream buffer zone rule and excess spoil disposal.
- consider additional rule-making to be more consistent with the CWA Section 404(b)(1) Guidelines.

d. Actions Unique to Alternative 1

The COE would:

- procedurally presume that most MTM/VF projects could be processed as IPs.
- coordinate with other agencies through an MOA and FOP.

The OSM would:

- consider revising the SBZ rule as inapplicable to excess spoil disposal in waters of the U.S., based on deference to the COE analyses of the aquatic resource impacts.

e. Actions Unique to Alternative 2

The COE would:

- make case-by-case determinations of the applicability of NWP 21 to MTM/VF projects through a coordinated interagency process.
- coordinate with other agencies through an MOA, JPP and FOP.

f. Actions Unique to Alternative 3

OSM and/or state SMCRA regulatory agencies would:

- issue permit approval prior to the CWA Section 404 authorization.

The COE would:

- presume that most MTM/VF projects begin processing as NWP 21.
- verify most projects under NWP 21, after the SMCRA permit is issued.
- coordinate with other agencies through an MOA, JPP and FOP.

3. Regulatory and Environmental Benefits of the Alternatives

The objectives of the action alternatives proposed in this EIS are to coordinate decision making to minimize regulatory duplication; improve natural resource characterization/impact predictions; improve permitting decisions to minimize, to the maximum extent practicable, the adverse environmental effects of MTM/VF; and minimize unnecessary paperwork and processing for the applicant. Some of the benefits are common to all alternatives while others may occur only with one or two of the alternatives. The environmental benefits of the three action alternatives are very similar. Similar environmental benefits are not uncommon for a programmatic EIS such as this where each alternative must conform with the CWA and SMCRA requirements.

a. Regulatory Process Benefits of All Action Alternatives

Under Alternatives 1, 2, and 3, the need to revise an issued SMCRA permit to incorporate CWA 404 concerns would be reduced as compared to the No Action Alternative. Both the CWA and SMCRA should be satisfied by the action alternatives through coordinated application reviews by the COE and SMCRA regulatory authority. For example, all projects would be required to undertake alternatives analyses demonstrating that fills in waters of the U.S. have been avoided and minimized to the maximum extent practicable. Under the No Action Alternative, SMCRA review and authorization occurs first, followed by a COE review that could require redesign of the mining plan and a modification of the SMCRA permit.

Common data elements in a joint application form could lead to more efficient analytical approaches among the agencies. Reliance on these analytical results could facilitate agreements among agencies and provide a basis for one agency to confidently rely on the findings of another agency. The MOA and FOP proposed by the action alternatives should improve consistency, permit coordination, and reduce the processing time with a logical, concurrent process.

Improved data collection resulting from the coordinated regulatory programs would lead to more descriptive identification of environmental resources. This allows inspection and monitoring of impacts based on changes from the baseline condition and facilitates demonstration of MTM/VF plan compliance and reclamation/mitigation success. More comprehensive data should improve prediction of impacts, speed regulatory processing, and decrease the number of deficiencies. Conversely, the necessity to collect data at certain times of year may delay applications and require applicants to build costly lead times into mine plan development.

Clarified regulatory concepts provide a basis for more predictable business and mine planning decisions by applicants and for other stakeholders to evaluate mining proposals. Available BMP manuals for mining controls (flooding, fugitive dust, blasting fumes), reclamation (fill minimization, revegetation), and mitigation practices would provide guidance for improved mine design and

applications that are more likely to fulfill performance standards and regulatory agency requirements.

The proposed action alternatives would better inform the public and provide for more meaningful participation. Aligning the different public comment periods is a possible outcome of agency coordination. Integrated regulatory programs and a coordinated review process could reduce processing times and costs of permit applications which may offset some of the increased costs and times associated with the additional data collection and analysis requirements of the actions. Program costs of Federally- and state-administered application reviews, inspection, and enforcement would be lower under Alternatives 2 and 3.

b. Distinguishing Process Benefits Between the Alternatives

No Action – Different process procedures occur in each state and/or COE District, or even within a state where multiple COE Districts are involved. Additional formalized processes such as the MOA, FOP, joint permit application, and numerous other guidelines are not in existence today but are proposed in Alternatives 1, 2 and 3 to improve consistency and coordination over the No Action Alternative.

Alternative 1 – Additional environmental data collection and assessments necessary to fulfill CWA Section 404(b)(1), NEPA, cumulative and secondary impact, and public interest review are required by the IP process. The IP process is very likely to add costs to the applicant. The application process would be considerably longer due to more thorough treatment of MTM/VF IP applications including more intensive COE review and NEPA analysis, and agency and public comments on the proposal. Enhanced information on aquatic resources proposed to be impacted, thorough impact predictions, and detailed plans for restoration of lost aquatic functions would improve regulatory processing and may offset some of the additional processing time associated with this alternative. Coordination between CWA and SMCRA agencies is included in this alternative, however is more difficult to implement than Alternatives 2 and 3. It is possible that state SMCRA administrative program costs could be reduced if a state chooses to rely on Federal reviews; however these state cost savings may be muted or non-existent because all MTM/VF proposals processed as IPs will still require state CWA Section 401 certification.

Alternative 2 – Coordination among the regulatory agencies would be maximized and would occur at the earliest stages of the application process under Alternative 2, resulting in more efficient and better decision making. Changes in a particular proposal affected by the review of one agency would not conflict with the mandates and policies of another. Concurrent reviews and evaluations would facilitate a comprehensive consideration of any particular proposal and result in a single set of comments and recommendations to the permit applicant. Data and information relative to a proposal could be shared by all reviewing agencies and other interested parties.

Similarly, the public and other interested parties can submit comments through a coordinated process and those agencies collaboratively evaluating the proposal can consider those comments comprehensively in the context of the entire proposal. Mitigation plans required for the proposal would be equally comprehensive, incorporating both CWA and SMCRA requirements (and likely to be considered earlier in the joint process), thereby facilitating the verification that various mitigation components of the plan are complementary. This coordinated process would also

facilitate oversight of mitigation implementation and monitoring, which would have environmental as well as process benefits.

This alternative would allow concurrent, coordinated regulatory reviews and each agency could consider the reviews of the other. Concurrent review would facilitate effective and timely regulatory decisions, including development of permit conditions, with the following consequences:

- support comprehensive consideration of environmental factors in permit actions in the CWA and SMCRA in order to enhance environmental protection;
- provide permit applicants with a unified permit application that would satisfy SMCRA and CWA Section 404 requirements, and promote efficiency by minimizing duplication; and
- furnish the public an opportunity to review and comment on a single comprehensive proposal rather than on portions of one proposal that are prepared to satisfy different regulatory authorities and that are offered for public review at different times.

Another benefit of this alternative is to ensure that agencies give adequate consideration to all other activities occurring in a watershed as they make their environmental decisions. Each agency would be responsible for maintaining a system (or database) to characterize proposed activities in a watershed relevant to its program and designate a liaison to serve as the principal contact for other agencies to expedite information exchange.

Alternative 3 – This alternative would result in a more effective and efficient regulatory process to satisfy CWA and SMCRA by using the SMCRA review as a focal point for gathering and analyzing information required by SMCRA and CWA 404. This alternative would promote a single lead agency with coal mining regulatory expertise for permitting and a framework for efficient, environmentally responsible production of energy resources. In addition, it would provide clear environmental performance targets for industry, stakeholders and regulators based on combined analyses of SMCRA and CWA performance standards, a better basis for decisions and findings by SMCRA regulators, and an improved ability for states, with more knowledge about environmental resources within their borders, local conditions, etc., to set priorities for mitigation. However, this alternative may not make the most efficient use of an integrated process which would maximize the networking of expert staff from CWA and SMCRA regulatory authorities (as in Alternative 2). Federal administrative costs of this alternative may be less than required under Alternative 1 and 2 because of the SMCRA lead role and reliance on state SMCRA regulatory authorities in Alternative 3.

c. Environmental Benefits of the No Action Alternative

The COE currently is developing guidance on assessing stream functions and quantifying mitigation to offset unavoidable aquatic impacts, similar to the guidance that would be provided under Alternatives 1-3. Individual state requirements, such as the increased emphasis on calculating peak discharges in West Virginia, would continue to apply under this alternative, as would the general emphasis on fill minimization, viable alternative post-mining land uses, and other regulatory improvements resulting from *Bragg* in West Virginia and Federal focus in the other states on similar

goals. If the No Action Alternative is selected without the additional data collection, analysis, reclamation guidance, policies, and regulations by the Federal programs envisioned under the action alternatives, the environmental benefits would not be as significant or consistent in the EIS study area.

Based, in part, on the interim 250-acre watershed threshold, CWA NWP 21 renewal requirements, and other program changes by SMCRA resource agencies (e.g., increased scrutiny of fill minimization and PMLU emphasis), there has been a reduction in the size and number of valley fills since the initiation of this EIS in 1998. The average number of fills approved in the EIS study area declined from 304 fills/year (1996-1998) to 217 fills/year (1999-2001). The average size of the fills during these two intervals also decreased 18 percent. Because of the reduction in the number and size of fills for the intervals 1996-1998 and 1999-2001, respectively, the total area directly impacted by fills decreased from 15,370 to 8,974 acres; watershed impacts decreased from 95,185 to 46,398 acres; and linear length of stream decreased from 145 to 107 miles. These data are derived from the valley fill inventory prepared for this EIS [Chapter III.K.2-5].

However, the "post-*Bragg*" regulatory environment in Appalachia was also affected by economic pressures on the industry. At times, excessive Appalachian coal supplies and reduced central Appalachian production were caused by highly-competitive coal sources. At other points in the past 4+ years, a temporary spike in the demand and commensurate price increase for Appalachian coal caused a surge in mining applications or re-activated idle permitted mines in temporary cessation. These factors and further uncertainties, due to the Rivenburgh injunction and other legal controversies, suppressed investment capital for new mines. It is difficult to apportion the influence of reduced MTM/VF environmental impacts, post-Bragg, among economic, legal, or regulatory factors.

The 250-acre threshold established in the Bragg agreement may be responsible in part for the reduction in the size and number of valley fills. Until such time as sufficient scientific data may be available to establish a specific minimal impact threshold, retaining the existing 250-acre threshold as a regional condition could provide an interim administrative basis for authorization of MTM/VF projects using NWP 21. The extension of this threshold through a regional permit condition by the COE is an independent action from this EIS. The threshold could remain in place until supplanted by a validated functional assessment protocol for case-by-case assessments of minimal impacts by the COE. This threshold is an initial NWP/IP screening tool and site-specific data may change the type of CWA Section 404 permit required (e.g., MTM/VF projects initiated as NWP may, after assessment, require IP, and vice versa). Scientific evidence, gained through the COE experience under NWP 21 and IP reviews, may warrant establishing some future type of watershed acreage, stream length, or stream flow condition that would be presumed by the COE to be a minimal impact threshold. [Chapter II.C.6-7, Actions 9 and 12].

Under this alternative, aquatic impacts from fills would continue at rates similar to those described above for the post-1999 period. However, environmental benefits from compensatory mitigation measures would increase based on changes to NWP 21 and the establishment of the COE stream functional assessment protocol. Many of the effects of program improvements of the last several years at both the Federal and state level are just now becoming evident, and those effects should increase as implementation progresses. Environmental benefits equal or greater than those expected

from the No Action Alternative would occur with the implementation of any one of the three proposed action alternatives.

d. Environmental Benefits of the Action Alternatives

Alternatives 1, 2 and 3 build upon existing "best science"methods, such as the WVSCI and the COE stream functional assessment protocol. The goal is to bring stakeholders as well as state and Federal agencies together to establish common criteria and science-based methods for determining baselines, impacts, and mitigation requirements. Monitoring information could be used to identify and evaluate T&E listed species habitats; stream reaches supporting naturally diverse and high quality aquatic populations; sole or principal drinking water source aquifers; or other specially-protected areas. This information could be a basis for considering ADIDs. By inclusion of a habitat quality evaluation, as well as the CWA Section 404(b)(1) Guidelines analysis (or its equivalent) in all three action alternatives, the least-damaging practicable alternative for the placement of fill in waters of the U.S. would be chosen.

The data mandated by different regulatory programs results in costly collection and analysis of voluminous information, typically only assessed for particular program requirements. Compiling similar data from varied sources could serve multiple program goals and objectives. The use of GIS to compile other relevant resource, ecosystem, or community information is a logical augmentation to the aquatic data for use in COE NEPA compliance. Use of information technology to collect, compile, screen, and update aquatic and other resource information in GIS, linked to various databases, would provide for better informed and timely permit decisions regarding aquatic impacts and a reference library to assist in future decisions.

Significant environmental benefits would be realized from the use of a coordinated permit process in combination with other regulatory aids and tools such as ADIDs and the COE stream assessment protocol. For example, the collaboration that would occur among the agencies in this coordinated regulatory process would facilitate the effective application of the alternatives test required by the CWA Section 404(b)(1) Guidelines. The application evaluation process would facilitate consideration of the "cost" provision in the definition of "practicable" as applied to the feasibility of MTM/VF alternatives. The institutional expertise unique to each agency could be employed in performing the CWA Section 404(b)(1) practicability test. These efforts could result in consideration of a greater range of alternatives, such as placing excess spoil in adjacent, previously-mined areas in order to avoid or substantially minimize fills in waters of the U.S.

Moreover, joint evaluations of MTM/VF proposals would result in more expansive considerations of both environmental impacts and effective treatments to mitigate those impacts. This coordinated process would also facilitate selection, implementation and monitoring of mitigation projects. The coordinated process and actions that make up the action alternatives could minimize adverse environmental effects by enhancing the following:

- identification of the environmental resources;
- prediction of environmental impacts;
- avoidance of special/high-value environmental resources;
- development of operation plans that mitigate (i.e. avoid, minimize, avoid, and compensate) adverse environmental impacts;

- consideration of the least damaging practicable alternative in fill placement;
- minimization of excess spoil material;
- consideration of adverse cumulative environmental effects;
- coordination of data sharing and analyses among key regulatory agencies to provide more informed decisions under the respective programs;
- technology transfer to identify the best practices reclamation techniques available to avoid or minimize adverse environmental impacts; and,
- communication among stakeholders and regulators.

Better stream protection from direct and indirect effects would result from improved characterization of aquatic resources; operations designed to avoid and minimize adverse effects and restore aquatic functions; and compensatory mitigation plans with improved design, inspection, and enforcement. Excess spoil fills would become smaller and placed in locations that minimize adverse environmental effects.

Enhanced assessments would reduce the cumulative adverse impacts of MTM/VF through more environmentally-protective designs; enhanced compensatory mitigation that emphasizes onsite reclamation and restoration of degraded streams within a watershed; identifying and developing best management practices for restoring aquatic functions impacted by mining; and inclusion of improved techniques to grow trees and more quickly restore mined land to better terrestrial habitat. Agencies would continue to identify better practices to reduce fugitive dust and fumes from mining, and thus, reduce impacts to adjacent communities. Flooding would be reduced by improved mining design, flood analysis, and, in the longer term, restoring the post mining land use to trees.

Improved communications, through pre-permit application meetings and the use of a designated regulatory authority as a focal point for initial data collection, should result in better cataloguing of T&E species, cultural, and historic properties, as well as addressing these issues at the earliest possible stages of permit review.

Table II.B-2 Distinctions Among MTM/VF EIS Alternatives

No Action Alternative	• Valley Fill impacts assessed on case-by-case basis to set NWP 21 or IP process; WV fills in less than 250-acre watershed generally eligible for NWP 21 • No SMCRA rules incorporating CWA 404(b)(1) data. • Coordinated SMCRA/CWA permit not assured. • No harmonized flooding potential evaluations. • SMCRA permit issued first for NWPs, and second for IPs; COE review may require revision of SMCRA permit. • COE does public interest and NEPA review, if IP. • ESA (T&E) and NHPA issues reviewed twice. • SMCRA buffer zone (SBZ) subject to interpretation. • Independent bonding under CWA and SMCRA.
Alternative 1 (Most MTM/VF proposals processed by COE as IPs)	• MTM/VF mostly authorized through CWA Section 404 IPs. • SMCRA permit authorization dependant on CWA Section 404 IP issuance. • SMCRA review defers to COE flooding evaluations. • IP process satisfies ESA and NHPA. • SMCRA SBZ rule inapplicable to excess spoil in waters of the U.S. due to CWA Section 404 analysis. • Protocol for ADID watersheds developed. • MOA and FOP for coordination; no joint application.
Alternative 2 (Coordinated review by CWA and SMCRA regulatory authorities)	• MTM/VF impacts assessed on case-by-case basis by COE: either NWP 21 or IP process followed, as appropriate; IP process satisfies ESA and NHPA. • SMCRA SBZ rules clarified and excess spoil rules added to require minimization and alternatives analysis. • consider additional rule-making to be more consistent with the CWA Section 404(b)(1) Guidelines • Concurrent review of CWA and SMCRA permit applications with separate determinations made. • Coordinated ESA and NHPA review; protocol for ADID watersheds developed. • MOA, JPP, FOP, and joint application used for coordination. • Coordinated CWA and SMCRA bonding.
Alternative 3 (SMCRA Review relied on for NWP 21 authorization)	• MTM/VF proposals subject to SMCRA review as a basis for COE NWP 21 approval, unless mitigation insufficient. • SMCRA SBZ and excess spoil rules finalized as in Alt. 2 • consider additional rule-making to be more consistent with the CWA Section 404(b)(1) Guidelines • CWA review relies on SMCRA findings and addition of off-site mitigation to offset unavoidable aquatic impacts; no emphasis on ADIDs. • SMCRA process largely satisfies ESA and NHPA. • MOA, JPP, FOP, and joint application used for coordination. • Coordinated CWA and SMCRA bonding.

C. DETAILED ANALYSES OF THE ACTIONS TO ADDRESS ISSUES

The following section is organized according to eleven significant issues raised during scoping of this EIS. Significance, in the NEPA context, is discussed above in Chapter II.A. Each issue is briefly described and followed by an explanation of the existing regulatory controls (the no action alternative) under the CWA, SMCRA, and related laws relative to the issue. Also explained are actions addressing each issue and the relation of the actions to the three proposed alternatives. The three alternatives contain groupings of 17 actions addressing the various issues. Some actions are common to all alternatives, while other actions pertain to only one or two of the alternatives. A schematic of the format for this section follows:

Table II.C-1
Summary of the Alternatives Carried Forward

<table>
<tr><th></th><th>No Action Alternative</th><th>Alternative 1</th><th>Alternative 2</th><th>Alternative 3</th></tr>
<tr><td>Issue 1: Government Efficiency</td><td>Existing program–case-by-case determination of CWA 404 permit type for fills in watersheds > 250 acres are generally IPs; fills in < 250acre watersheds are NWP</td><td>Action 1.1
COE Lead--most CWA 404 permits IP</td><td>Action 1.2 Coordinated Lead–CWA 404 permits can be NWPs (with regional conditions) or IPs</td><td>Action 1.3 SMCRA as the platform--most CWA 404 permits are NWP 21</td></tr>
<tr><td>Issue 2: Definitions</td><td>Existing (CWA) program –COE defined bed and bank (OHWM)</td><td colspan="3">Action 2 Consistent stream definitions</td></tr>
<tr><td rowspan="2">Issue 3: Direct Stream Loss</td><td rowspan="2">Significant adverse effect; water quality standard (CWA); material damage; Current SBZ rule-making (OSM)</td><td>Action 3.1
SBZ N/A to excess spoil</td><td colspan="2">Action 3.2/3.3 Continue current SBZ rulemaking to require minimization of disturbances and prevention additional contributions of suspended solids in streams outside permit area</td></tr>
<tr><td colspan="2">Action 4.1/4.2 Designate areas with Advance ID</td><td>—</td></tr>
<tr><td rowspan="2">Issue 4: Stream Impairment</td><td rowspan="2">Anti-degradation, water quality standards, NPDES, TMDL (CWA)</td><td colspan="3">Action 5 Evaluate effects of MTM/VF and develop/propose new WQS</td></tr>
<tr><td colspan="3">Action 6 Refine uniform, science-based protocols for assessing function, making permit decisions, and setting mitigation.</td></tr>
<tr><td>Issue 5: Fill Minimization</td><td>AOC (SMCRA); rule-making to require demonstration that excess spoil and adverse impacts from fill construction are minimized; no practical upland alternative (CWA)</td><td colspan="3">Action 7 Continue SMCRA rule making to require a demonstration that excess spoil and adverse impacts from fill construction are minimized</td></tr>
</table>

	No Action Alternative	Alternative 1	Alternative 2	Alternative 3
Issue 6: Stream Habitat & Aquatic Function	Baseline data collection, monitoring, mitigation	**Action 8** BMP Manual for stream protocol and mitigation		
		Action 9 Refine protocols, collect data in GIS, assess minimal threshold		
		Action 10 Mitigation inspection, bonding		
		—	**Action 11** SMCRA apply COE protocol to determine on-site mitigation	
Issue 7: Cumulative Impacts	CHIA (SMCRA); projects cumulatively < minimal (CWA); NEPA	**Action 12** Refine protocols, collect data in GIS, assess cumulative threshold		
Issue 8: Deforestation	PMLU, revegetation (SMCRA); riparian vegetation as mitigation (CWA)	**Action 13** BMP Manual for growth media, reclamation with trees, and measuring success of reforestation.		
		Action 14 Congressional authority to require reclamation with trees		
Issue 9: Air Quality	PM 2.5/10, fugitive dust (CAA); fugitive dust (SMCRA)	**Action 15** BMP Manual for controlling fugitive dust and blasting fumes		
Issue 10: Flooding	CWA 404; PHC (SMCRA)	**Action 16** Flooding Guidelines		
Issue 11: T&E Species	ESA Section 7	**Action 17** Program changes if necessary to comply with ESA		

1. Government Efficiency; Sub-issue: Coordinated Decision Making

Regulation of surface coal mining operations balances resource recovery with environmental conservation, restoration, mitigation, and enhancement. There are a number of Federal/state laws and implementing rules regulating the coal industry and providing for the protection of people and the environment. The Federal agencies have a common administrative mandate to minimize duplication among the various regulatory programs [33 U.S.C. 1211(c)(12); 30 U.S.C. 1292(c) and 1303(a), and 33 CFR 322.2(f)(2)]. Coordination among the agencies leads to efficient achievement of regulatory purposes. Agencies can avoid wasteful expenditure of human resources and public funds if the regulatory products of one agency satisfy the requirements of another program. The benefit of government collaboration was part of the stated purpose of this EIS "to consider developing...coordinated agency decision-making processes...." [64 FR5778, February 5, 1999] Therefore, this EIS proposes an action to establish an integrated regulatory process for MTM/VF operations.

In West Virginia, the COE, OSM, EPA, FWS, and WVDEP have coordinated review of surface coal mining permit applications proposing excess spoil disposal in valley fills since 1999 through an "interim permitting" process [see *Bragg* discussion in Chapters I.C.2.d.4. and I.C.3.b.1.]. This resulted in interagency review procedures, protocols, and other guidelines that encourage early involvement and networking among the agencies. While an interim permitting process similar to that in West Virginia does not exist in Virginia and Kentucky, increased coordination is occurring in those states as well between state and Federal agencies. The West Virginia interim permitting experience, along with the program review conducted as part of this EIS, have revealed that increased coordination, institutionalized through interagency agreement, could provide for

information sharing, streamlining the permitting process, and enhancing the ability to accomplish agency regulatory purposes.

a. No Action Alternative: The Regulatory Program Today

Surface coal mining in the steep slope regions of Appalachia requires a SMCRA permit from the appropriate state regulatory agency in Kentucky, Virginia, or West Virginia, or from the OSM in Tennessee. If the proposed mining operation involves impacts to waters of the U.S., the applicant must seek CWA Section 404 authorization from the COE. The CWA Section 404 NWP 21 permit is used most extensively by applicants for MTM/VF proposals. This permit applies to impacts to waters of the U.S. "associated with surface coal mining and reclamation operations...authorized by the Department of the Interior, Office of Surface Mining or by states with approved programs under...SMCRA." [67 FR 2081.] Minimizing duplication of Federal regulations is one of the purposes behind NWP 21. The COE maintains that its review should not duplicate the SMCRA agency review performed in coordination with other Federal and state resource agencies. SMCRA requires compliance with the same Federal environmental laws, such as NEPA, FWCA, ESA, and NHPA as the COE does in executing its regulatory program. The COE reviews the SMCRA information to assure that the impact analysis and mitigation are in compliance with the COE policy and regulations, including the CWA Section 404(b)(1) Guidelines. State certification of CWA Section 404 permits under CWA Section 401 and CWA Section 402 permits for point source discharges are typically required prior to coal mining [Chapter II.C.4.a.]. A summary of the various regulatory processes used in evaluating proposed MTM/VF operations is as follows:

- SMCRA application reviewed by state or OSM;
- NPDES authority, either concurrently or sequentially, evaluates CWA Section 402 point source discharges;
- Approved SMCRA permit results in application for CWA Section 404 authorization by COE;
- COE requests state CWA Section 401 Certification;
- CWA Sections 401, 402, and 404 authorizations must be obtained prior to commencing operation; and
- Other regulatory reviews (e.g., ESA, NHPA, CAA, MSHA, OSHA, etc., as necessary) are provided for and considered during processing of the SMCRA and CWA Section 404 application.

At any stage of these reviews, the regulatory agencies may identify deficiencies that require revisions to the application or result in denial of the MTM/VF proposal. Most agency approvals are conditioned on obtaining all other necessary authorizations prior to initiating coal mining. If revisions are required by any agency after authorization of a project by another agency, the changes to the approved mine plan must be reconsidered. In an effort to minimize this occurrence, the COE Districts are encouraging pre-application meetings with mining companies. Flow charts illustrating the SMCRA and NPDES processing of MTM/VF proposals in West Virginia, and a general depiction of the CWA Section 404 process by the COE, can be found in Appendix B, Figures 1-3.

a.1. CWA Section 404

The goal of the CWA is to protect and restore the chemical, physical, and biological integrity of the nation's waters. CWA Section 404 helps to achieve this goal by regulating the placement of fill

material into waters of the U.S. CWA Section 404 permit applications are evaluated using the Section 404(b)(1) Guidelines to assure this goal is met.

The Guidelines require the identification of the aquatic resources affected; avoidance and minimization of impacts; prediction of the level of unavoidable impacts for various project alternatives analyzed; as well as a description of the amount and type of mitigation required to offset the unavoidable impacts. The COE is required by the Guidelines to make factual findings on chemical and physical impacts (substrate; suspended particulates/turbidity; changes in water; current patterns and water circulation; normal water fluctuations; and salinity gradients) and biological impacts (threatened or endangered species; fish, crustaceans, mollusks, and other aquatic organisms in the food web; and other wildlife). A detailed description of the chemical aspects of aquatic resources currently being collected are discussed in Chapter II.C.4 (Stream Impairment). The physical and biological data available from other programs are discussed in Chapter II.C.5 (Direct Stream Loss), Chapter II.C.6.a.2. (Assessing and Mitigating Stream Habitat and Aquatic Functions) and Chapter II.C.7.b. (Cumulative Impacts).

To predict the level of direct impact to aquatic resources, determine the type of CWA Section 404 permit process, and establish the level of mitigation, the COE is refining and employing a stream assessment protocol in the districts in the EIS study area [Chapter II.C.6.a.1.]. Indicators of aquatic functions, as used in this protocol, include the chemical, physical and biological characteristics of biotic and abiotic integrity. Variables measuring the physical and chemical (abiotic) integrity include conductivity, riparian width, canopy, and embeddedness. Variables measuring the biological (biotic) integrity include taxa richness, EPT richness, mHBI, percent Ephemeroptera, and percent (Chironomidae + Oligochaeta). To the extent that some or all of these data are currently being collected by one or more state or Federal agencies, the COE could rely on this information.

Fills in waters of the U.S. by MTM/VF can be authorized by the COE through either the general permit or IP process. If MTM/VF projects result in no more than minimal adverse impacts to aquatic systems, including mitigation, they may be authorized by NWP21, a type of general permit. NWP 21 was re-issued on January 15, 2002 with changes. The COE districts intend to implement a stream functional assessment protocol in all of the districts in the EIS study area to make case-by-case determinations, in addition to reliance on the SMCRA approval, to issue appropriate NWP 21 authorizations. See Chapters II.5.C.a.1. and II.6.C.a.1. for further discussion on IPs, NWPs, the COE protocol, and mitigation.

Minimal Impact Thresholds and NWP 21

The COE made the commitment in the reissuance of the NWPs in 2002 to re-evaluate the possibility of an upper threshold for NWP 21 after this EIS is completed [67 FR 2021]. The COE noted that data collected in this EIS, along with other available information including information resulting from individual verification of all NWP 21 projects, would be useful in determining the appropriateness of NWP 21 individual and cumulative minimal impact thresholds. Thresholds could be effective in minimizing environmental impacts and providing predictability to the stakeholders. In addition, thresholds could help the COE District better manage workloads.

As an interim measure, the COE is preparing to implement a regional condition to NWP 21, applicable to MTM/VF activities in waters of the U.S., concurrent with this EIS. The COE agreed in the *Bragg* settlement to establish a condition in West Virginia that valley fills in watersheds less

than 250 acres could generally be authorized by NWP 21. The COE Huntington District found this condition contributed to conscious attempts by the regulated coal industry to avoid the IP process by keeping proposed fill sizes below the 250-acre threshold. Consequently, as of July 2002, 81 proposals were eligible for NWP 21 in West Virginia and 5 were processed as IPs. The COE Huntington District has processed more than 160 NWP 21 permitting actions involving fills in West Virginia and Kentucky since the start of 1999.

Based, in part, on the interim 250-acre watershed threshold, CWA NWP 21 renewal requirements, and other program changes by SMCRA resource agencies (e.g., increased scrutiny of fill minimization and PMLU emphasis), there has been a reduction in the size and number of valley fills since the initiation of this EIS in 1998. The average number of fills approved in the EIS study area declined from 304 fills/year (1996-1998) to 217 fills/year (1999-2001). The average size of the fills during these two intervals also decreased 18 percent. Because of the reduction in the number and size of fills for the intervals 1996-1998 and 1999-2001, respectively, the total area directly impacted by fills decreased from 15,370 to 8,974 acres; watershed impacts decreased from 95,185 to 46,398 acres; and linear length of stream decreased from 145 to 107 miles. These data are derived from the valley fill inventory prepared for this EIS [Chapter III.K.2-5].

However, the "post-*Bragg"* regulatory environment in Appalachia was also affected by economic pressures on the industry. At times, excessive Appalachian coal supplies and reduced central Appalachian production were caused by highly-competitive coal sources. At other points in the past 4+ years, a temporary spike in the demand and commensurate price increase for Appalachian coal caused a surge in mining applications or re-activated idle permitted mines in temporary cessation. These factors and further uncertainties, due to the *Rivenburgh* injunction and other legal controversies, suppressed investment capital for new mines. It is difficult to apportion the influence of reduced MTM/VF environmental impacts, post-*Bragg,* among economic, legal, or regulatory factors.

The 250-acre threshold established in the *Bragg* agreement may be responsible in part for the reduction in the size and number of valley fills. Until such time as sufficient scientific data may be available to establish a specific minimal impact threshold, applying a 250-acre threshold as a regional condition in a defined geographic area could provide an interim administrative basis for authorization of MTM/VF projects using NWP 21. The extension of this threshold, through a regional permit condition by the COE, is an independent action from this EIS. The threshold could remain in place until supplanted by a validated functional assessment protocol for case-by-case assessments of minimal impacts by the COE or sufficient scientific data are available to establish a specific "bright line" threshold. The threshold would be a useful management tool and may be rebutted with further scientific data and analysis with each case-by-case MTM/VF proposal. Scientific evidence, gained through COE experience under NWP 21 and IP reviews, together with information from SMCRA, CWA 402, and other water quality or related programs, may warrant establishing some future type of watershed acreage, stream length, or stream flow condition that would be presumed by the COE to be a minimal impact threshold. [Chapter II.C.6 and II.C.7, Actions 9 and 12]

This threshold is an initial NWP/IP screening tool and site-specific data may change the type of CWA Section 404 permit required. Under the terms of this regional condition, the COE would rely on case-by-case use of functional stream assessments, in tandem with the acreage threshold. That is, fills proposed within watersheds less than the 250-acre threshold, would initially begin processing

as a NWP. Similarly, fills in watersheds larger than 250-acres would initially begin processing as an IP. Upon submission of a MTM/VF proposal in either CWA Section 404 permit process category, the COE would evaluate appropriate physical, chemical, and biological data on proposed aquatic impact locations (supplied by the applicant or gathered by the COE), along with offsetting mitigation plans, to see if the initial presumption holds. Stream assessment, mitigation, or other information and analyses may redirect an application into the other permit review category. For instance, a fill proposed in a 300-acre watershed may initially be processed by the COE as an IP. If the stream assessment and mitigation proposal ultimately show that particularly high quality streams are not impacted and mitigation reduces net impacts to less than minimal, the project may be authorized by NWP 21. Conversely, a NWP 21 project proposal for two fills in 125-acre watersheds could occur in extremely high quality streams where mitigation does not adequately offset impacts. Such a finding by a COE District may trigger redirecting the initial NWP 21 proposal to the COE IP process.

CWA Section 404(b)(1) Guidelines Compliance

All CWA Section 404 IPs must comply with the CWA Section 404(b)(1) Guidelines, codified as regulations at 40 CFR 230. The IP is not in compliance with the Guidelines unless all four criteria restricting the placement of fills in waters of the U.S. are met [40 CFR230.10(a)-(d)] :

> "(a): Except as provided under section 404(b)(2) [CWA Section 404(b)(2) provides a Guidelines compliance waiver for interests of navigation], no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. [5 examples of alternatives are listed as subsections in 40 CFR 230.10(a)(1)-(5).]
>
> "(b): No discharge of dredged or fill material shall be permitted if it:
>
> > "(1) Causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable State water quality standard;
> >
> > "(2) Violates any applicable toxic effluent standard or prohibition under Section 307 of the [CWA] Act;
> >
> > "(3) Jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in the likelihood of the destruction or adverse modification of a habitat which is determined by the Secretary of the Interior or Commerce, as appropriate, to be a critical habitat under the Endangered Species Act of 1973, as amended. If an exemption has been granted by the Endangered Species Committee, the terms of such exemption shall apply in lieu of this subparagraph;
> >
> > "(4) Violates any requirement imposed by the Secretary of Commerce to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

> "(c): Except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted which will cause or contribute to significant degradation of the waters of the United States. Findings of significant degradation related to the proposed discharge shall be based upon appropriate factual determinations, evaluations, and tests required by SubpartsB and G, after consideration of Subparts C through F, with special emphasis on the persistence and permanence of the effects outlined in those Subparts. Under these Guidelines, effects contributing to significant degradation considered individually or collectively, include: ... [4 examples of significant degradation are listed as subsections in 40 CFR 230.10(c)(1)-(4).]
>
> "(d): Except as provided under Section 404(b)(2), no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem. Subpart H identifies such possible steps."

For fills proposed in special aquatic sites (e.g., riffle/pool complexes and wetlands), as defined in Subpart F of the Guidelines at 40 CFR 230.40-45, the COE evaluates the applicant's responses to the two rebuttable presumptions set forth in 40 CFR 230.10(a). The rebuttable presumptions include the following: 1) alternatives that do not involve special aquatic sites are presumed to be available, and 2) those alternatives are presumed to have less adverse impact than the proposed fill in waters of the U.S.

The CWA permit can be denied if it does not comply with the Guidelines.

Secondary and Cumulative Impact Review

IPs evaluated by the COE also consider secondary and cumulative impacts. Secondary impacts are indirect impacts caused by the proposed action, occurring later in time or further removed in distance from the project, and must be reasonably foreseeable to be considered [40 CFR 1508(b)]. For example, an IP for a MTM/VF project including sediment ponds would consider the downstream impacts of discharges from the ponds, even though the discharges are addressed through the CWA Section 402 program.

Cumulative impact considerations occur in two different contexts. The first context is the cumulative nature of all similar activities, such as all valley fills in a watershed. The second is the NEPA context of all human development on an ecoregion, in a watershed, or to a particular resource. Cumulative impact reviews are discussed at length in II.C.7.a.

Public Interest Review

The public notice for IPs is the primary method of advising all interested parties of the proposed activity for which the permit is sought and of soliciting comments and information necessary to evaluate the probable impacts of the activity. Copies of public notices are sent to all parties who have specifically requested copies of the public notices, to the U.S. Senators and Representatives for the area where the work is to be performed, the field representatives of all of the Federal agencies, the head of the state agency responsible for fish and wildlife resources, and the State Historic Preservation Officer. It is presumed that all interested parties and agencies wish to respond to public notices; therefore, a lack of response is interpreted as meaning that there are no objections

to the proposed project. District Engineers must update public notice mailing lists at least every two years, although many districts are now placing public notices on their websites to reduce mailing costs. [33 CFR 325.3]

Once the Guidelines are satisfied, the COE evaluates the comments and, with any required additional information, ensures that the proposed IP project is not contrary to "public interest." A project may have an adverse effect, a beneficial effect, a negligible effect, or no effect on any or all of the public interest factors [33 CFR 325.3(c)]. The public interest review considers the balance of reasonably foreseeable benefits and detriments of the proposed project. The criteria include:

- The extent of the public and private need for the project;
- Where unresolved conflicts exist as to the use of the aquatic resource, whether there are practicable alternative locations or methods that may be used to accomplish the objective of the project; and
- The extent and permanence of the beneficial or detrimental effects the proposed work is likely to have on the private and public uses to which the project site is suited.

Under the CWA Section 404(q) Memoranda of Agreement between EPA and the Department of the Army, and between the FWS and the COE (dated August 11 and December 21, 1992, respectively), the EPA and/or FWS can elevate a disagreement over a proposed decision by the COE to issue a CWA Section 404 permit if the proposal would have a substantial and unacceptable impact on an Aquatic Resource of National Importance (ARNI), as defined by the MOAs. The disagreement is elevated to higher authorities within each agency for resolution. Although FWS and EPA each have the independent option of initiating the CWA Section 404(q) elevation procedure for adverse impacts regarding ARNIs, only EPA has the authority under CWA Section 404(c) to veto a COE CWA Section 404 permit. EPA also has the authority to issue an advance CWA Section 404(c) veto for a specific geographic area of aquatic resources prior to the COE receipt of a CWA Section 404 permit application. This CWA Section 404(c) veto authority can be initiated over concerns regarding unacceptable significant adverse impacts to waters of the U.S., including cumulative impacts.

a.2. CWA Section 404 State Assumption and Programmatic General Permits

Two provisions of the CWA allow states to obtain Section 404 permitting authority, if the state initiates a request. First, CWA Section 404(g) allows for state assumption of the entire CWA Section 404 program, provided that certain requirements are met. Partial state assumptions are not approvable under CWA Section 404. [40 CFR 233.1] The states receive no Federal money to support their programs. Because assumption under CWA Section 404(g) is a complete transfer of the program to the state for certain non-navigable waters, there are no "Federal actions" involved with the administration of the program by a state. Thus, NEPA and other Federal laws applicable to "Federal actions" do not apply to state authorizations pursuant to CWA Section 404(g). However, NEPA compliance is required at the time of state assumption. Although the COE transfers CWA Section 404 authority to the state, EPA retains oversight responsibility.

The second way states may gain some control of the 404 program is through CWA Section 404(e), which allows the Secretary of the Army to issue general permits on a state, regional, or nationwide basis for any category of activities involving discharges of dredged or fill material. The COE

defines a programmatic permit as a type of general permit founded on an existing state, local or other Federal agency program and designed to avoid duplication with that program [33 CFR 325.5 (d)]. The COE uses SPGPs to authorize state agencies to issue CWA Section 404 permits for certain activities. To do this, SPGPs contain special conditions to ensure the effectiveness of these programs and consistency with CWA Section 404 objectives. In addition to the levels of COE review and discretionary provisions, these special conditions may restrict the impact of permitted activity to a geographic area or thresholds, such as the area or length waters of the U.S. affected by a project. If a threshold is exceeded, a state refers the activity to the COE for review. While the COE cannot deny the permit because a SPGP threshold is exceeded, it can require that the activity go through the IP process.

States seeking to obtain SPGPs must have laws comparable to the CWA Section 404 program. However, SPGPs are approved for a distinct category of activities and based on a state's proven track record of effectiveness in administering the comparable state law. After SPGP approval, the COE performs oversight review of each state action. States that have been issued SPGPs must also comply with annual reporting requirements.

The COE must comply with NEPA before issuing an SPGP. Since assumption under CWA Section 404(e) is not a complete transfer of the program to the state, there are "Federal actions" involved with the authorizations of projects by a state. Thus, NEPA and other Federal laws (e.g., ESA and NHPA) applicable to "Federal actions" apply to state authorizations pursuant to CWA Section 404(e). The COE and EPA retain oversight responsibility.

Other Federal agencies may obtain the authority to issue CWA Section 404 permits under the Regional General Permit (RGP) provision of CWA Section 404(e). RGPs may be issued by a district or division engineer for a category or categories of activities after public notice and evaluation of comments. A Federal agency seeking a RGP must have a program in place with requirements comparable to the CWA Section 404, such as the ability to require offsite mitigation and the CWA Section 404(b)(1) analysis. For activities authorized by RGPs, notification to the COE may be required, but procedures vary from district to district. For example, districts may require a case-by-case reporting and acknowledgment system. Regional permits are similar to nationwide permits, but they usually cover a smaller geographic scale.

a.3. SMCRA

SMCRA is a comprehensive program to regulate surface coal mining and reclamation operations. SMCRA requirements are similar to the CWA Section 404 relative to aquatic resources. The provisions at 30 U.S.C. 1265(b)(10) seek to minimize disturbance of the hydrologic balance within the permit and adjacent area and prevent material damage outside of the permit area [see also 30 CFR 816.41]. SMCRA, at 30 U.S.C. 1265 (b)(24), also mandates that the operator shall, to the extent possible using the best technology currently available, minimize disturbances and adverse impacts to fish, wildlife, and related environmental values, and shall achieve enhancement of such resources where practicable [see also 30 CFR 616.97].

SMCRA regulations at 30 CFR 816.57, known as the stream buffer zone (SBZ) rule, preclude impacts within 100 feet of intermittent and perennial streams absent a finding that 1) mining activities will not cause or contribute to a violation of applicable state or Federal water quality standards, and will not adversely affect the water quantity and quality or other environmental

resources of the stream; and 2) if there will be a temporary or permanent stream-channel diversion, it will comply with specific requirements applicable to the construction of diversions.

Similar to the CWA Section 404 program, SMCRA performance standards are achieved through the collection of baseline hydrologic resource data, predictions of impacts to the resources, and design of mine plans to minimize impacts. As discussed in Chapter II.C.7.b., the assessment of hydrologic impacts, while in conformance with SMCRA performance standards, varies from state to state. Typically, these assessments are based on predicted loading (generally for pH, flow, iron, TDS concentrations and other pollutants of concern) from all coal mining outfalls and water quality in an identified cumulative impact area. To better facilitate the preparation of this assessment in a standard format, OSM developed a reference document outlining a sound technical approach for obtaining and analyzing the available geologic and hydrologic information. Currently, OSM is working with the Interstate Mining Compact Commission to compile the best technical approaches for developing PHCs and CHIAs. Because hydrology varies across the nation, the technical approach to these hydrologic analyses and development of material damage criteria are best suited to regional or similar geologic and hydrologic conditions.

The SMCRA regulations do not currently contain requirements for biological monitoring or documenting physical attributes of streams. SMCRA requirements, similar to EPA water quality standards, presume that maintaining water quality and minimizing contributions of sediment are surrogates for ensuring biological integrity. Many state SMCRA or water quality agencies currently require or collect biological, physical and chemical data following established protocols. The protocol most often used for biological assessment is the EPA Rapid Bio-assessment Protocol, which includes establishing a number of sampling stations, providing habitat evaluations, descriptions, scores, and providing macroinvertebrate metric values and scores for the Family Biotic Index at the sampling stations [Chapter II.C.4.a.5].

The SMCRA authority may authorize placement of fill in intermittent or perennial streams if it finds:

- In writing, based on the CHIA, that material damage to the hydrologic balance is prevented offsite [30 CFR 773.15(e)]; and,
- That mining activities will not cause or contribute to a violation of applicable State or Federal water quality standards, and will not adversely affect the water quantity and quality or other environmental resources of the stream [30 CFR 816.57].

For excess spoil placement in ephemeral streams, the first finding cited above applies, but the second finding is not required. These requirements are discussed in more detail in Chapters II.C.7.b.(Cumulative Impacts) and II.C.3.a.2 (Stream Impairment).

The sequence and timing of project approval under CWA Sections 401, 402, and 404 can result in revision and reprocessing of previously-approved SMCRA permits. The need to change mine plans is inefficient and will likely result in increased time and cost for the applicant to secure a SMCRA permit revision and increased costs to the agencies. Evaluation by all decision agencies early in the planning phase of a mine plan provides greater flexibility to accommodate changes during the design phase, before substantial time and money have been invested in developing a final mine plan and securing all of the necessary permits.

a.4. Other Regulatory Programs

Other CWA reviews may require collection and assessment of aquatic resource data and impact predictions in order to authorize point source discharges (CWA Section 402, including NPDES, TMDL, and anti-degradation) and prepare state water quality certifications (CWA Section 401) [Chapter II.C.4.a.] These programs generally require the collection of water quality data which may become part of other program environmental analyses such as individual or cumulative impacts under CWA Section 404 and SMCRA.

a.5. Permit Sequencing

The typical sequence and timing between issuance of the SMCRA permit, the CWA Section 401 Certification, and CWA Section 402/404 permits was previously described above in Chapter II.C.1.a. Sequence and timing issues for these different permits are of concern to applicants, the agencies, and other stakeholders. Currently, under NWP 21, COE Districts receive mining applications for impacts to waters of the U.S. after the company has obtained the necessary SMCRA permit. Only at this time does the COE District complete its case-by-case determination on the applicability of the NWP. COE Districts are encouraging meaningful pre-application coordination with the applicant to obtain project-specific information regarding potential requirements necessary for securing a CWA Section 404 permit promotes efficiency through information sharing. This COE/applicant coordination, prior to submission of the COE application, helps provide the applicant with a fair, reasonable, and timely response and enhances protection of the aquatic environment.

b. Alternative 1: The Size, Number, and Location of Valley Fills in Waters of the U.S. are Determined by the COE CWA Section 404 Permit Process

Under this alternative, all MTM/VF projects proposing valley fills in waters of the U.S. would initially be reviewed by the COE as a CWA Section 404 IP rather than as a general permit. The COE would make an initial case-by-case determination of the size, number, and location of valley fills in waters of the U.S. Following this initial determination, the applicant could commence the SMCRA and other requisite application processes (e.g., NPDES, MSHA, etc.). The result of this alternative would be a series of consecutive, coordinated reviews and decisions by the COE and appropriate SMCRA agency.

Even though the COE would make the initial determination of the siting of fills, coordination and cooperation among the COE, EPA, OSM, FWS, and their state counterparts are integral in Alternative 1 to reviewing MTM/VF proposals. This coordination would be provided for in an MOA. This alternative would operate with a procedural presumption that, as a general matter, MTM/VF projects with fills in waters of the U.S. would begin the process as IPs.

Under this alternative, OSM would consider rulemaking to provide that the SBZ zone rule at 30 CFR 816.57 does not apply to excess spoil disposal in waters of the U.S. (Action 3.1). SMCRA permits would continue to state that all appropriate permits, such as the CWA Section 404 permit, must be secured prior to mining. This action would eliminate regulatory duplication and confusion, curtail unauthorized filling of waters of the U.S., and resolve perceived or actual conflict between regulation and statutory provisions within SMCRA and the CWA.

The principal difference between the regulatory framework in this alternative and the framework in the other alternatives is that the COE CWA Section 404 process would, to the extent allowed under

Federal statutes and regulations, including state water quality certifications, establish the initial limits on the size, number, and location of all valley fills proposed to be constructed in waters of the U.S. Any subsequent actions under SMCRA on a permit application would recognize the constraints established by the COE. The COE would also rely on the subsequent SMCRA permit application for information pertinent to whether an EIS or EA is needed.

Action 1.1: The COE, through an MOA establishing coordination with other agencies, would initially process all MTM/VF projects proposing to construct valley fills in waters of the U.S. as CWA Section 404 IPs.

b.1. Process and Regulatory Responsibilities

Process

This action contemplates the COE leading a coordinated IP permit process for MTM/VF, formalized through an MOA. This MOA could describe how the COE would encourage other agencies to participate in pre-application meetings, coordinate the sequencing of the IP with other MTM/VF authorizations, frame dispute resolution procedures and describe each agency's role in the process, as discussed below. The objective is to minimize duplication, unnecessary paperwork for the applicant and improve permitting decisions to protect or enhance the environment.

The COE would perform an initial review of an IP permit application to determine if avoidance, minimization, and alternative analyses have been performed and that the fill sites selected are lower functioning stream segments than those avoided; or that no practical upland alternative to the project proposal exists. An initial indication of possible project "approvability" may occur if the following conditions are met:

- Stream functional assessment data appears complete and the COE's preferred stream "scoring" process was followed;
- The applicant's projection of impacts to aquatic resources appears thorough and reasonable;
- The mitigation proposal provides appropriate combinations of on- and off-site watershed restoration, improvement or compensation for in-kind, in-basin work within the CIA to offset any direct loss of stream function or indirect impairment anticipated (meets, if appropriate and practical, TMDL plan if a CWA Section 303(d)-listed stream is involved);
- The COE evaluates aquatic impacts for issues with T&E species consulting with FWS in accord with ESA Section 7;
- The COE determines that the project is likely to comply with the four criteria to restrict fills in waters of the U.S. as listed in the CWA Section 404(b)(1) Guidelines; and
- The COE evaluates impacts to cultural/historic properties, complying with Section 106 of NHPA.

If the initial COE review rates an application as likely to comply with CWA Section 404(b)(1) Guidelines and suitable for further processing, the COE causes the SMCRA and state water quality agencies (if separate), and NPDES, CWA Section 401 certification to be notified by the applicant. Then, SMCRA completeness/technical adequacy reviews can be initiated. If the COE review

concludes the application is not likely to comply with CWA Section 404(b)(1) Guidelines (particularly high-value aquatic sites not avoided; fills not minimized; other upland alternatives not considered; stream values mis-identified; mitigation inadequate to offset; etc.), the applicant is informed by the COE that the plans must be revised.

The COE would evaluate proposals to construct valley fills in waters of the U.S. as IPs using the CWA Section 404(b)(1) Guidelines [Chapter II.C.1.a.1.], secondary impact review [Chapter II.C.1.a.1], and cumulative impact review [Chapter II.C.7.a.1], public interest review [Chapter II.C.1.a.1.], and NEPA compliance review [described below and in Chapter II.C.7.a.]. The COE standard operating procedures specify that the amount of information needed to make such determinations and the level of scrutiny required by the Guidelines should be commensurate with the severity of the environmental impact. Under the COE procedures, the severity of impact is determined by the functions of the affected aquatic resource and the nature of the proposed activity and the scope/cost of the project. The Guidelines require that the COE consider potential alternatives (i.e., that accomplish the project purpose without affecting waters of the U.S.) that are practical to the applicant taking into consideration cost, technology, and logistics.

Alternative 1 includes a provision that would allow some MTM/VF proposals to be authorized as NWPs when the COE's IP process demonstrates that the proposal would result in adverse impacts that are no more than minimal, both individually and cumulatively. If the COE reaches the conclusion that the resulting individual and cumulative adverse aquatic impacts are clearly projected to be no more than minimal, the IP process could be halted and the project authorized under the NWP. Under Alternative 1, more proposals are expected to complete the IP decision-making process than now occur under the No Action Alternative.

When the SMCRA review of mine sequencing, backfilling and grading and hydrologic reclamation plans (e.g., stability, acid and toxic forming material handling, configuration, drainage control, hydrologic consequences, cumulative hydrologic impacts, access, etc.); post mining land use, bonding and revegetation proposals; and blasting, roads, sediment ponds, impoundments, and other support facilities are finalized, the COE could utilize this information to augment the NEPA compliance and public interest review. In addition to the COE ESA consultation with the FWS concerning aquatic resources, the SMCRA agency would coordinate with FWS on additional T&E concerns in upland areas.

Ultimately, the SMCRA regulatory authority would consult with the COE on each agencies' concurrent or separate review findings. The applicant would be notified of additional data and/or analysis needs or other shortcomings which must be addressed to satisfy NEPA, SMCRA, ESA, NHPA, CWA Sections 401/402/404, etc. The COE and states (or OSM in Tennessee) would continue to coordinate until the applicant provides all required components and the final permit decisions are made.

Regulatory Responsibilities

Under this alternative, the COE would continue to be responsible for evaluating and subsequently authorizing or denying CWA Section 404 permits for the placement of fills in waters of the U.S. The COE would conduct this evaluation initially under its IP process. As a result, most of the proposals for MTM/VF activities requiring fills in waters of the U.S. would be processed completely through the IP procedures, concluding with IP decisions. The few remaining MTM/VF proposals

not processed as IPs, as well as surface coal mining and reclamation operations other than MTM/VF, could be authorized under NWP 21. The initial evaluation and ultimate determination by the COE to authorize the proposal under NWP 21 or to proceed through the IP process to its conclusion would be based on case-by-case evaluations of the project's adverse impacts on the aquatic environment. The COE also would conduct additional review in the IP process to ensure the project is not contrary to the public interest.

In making its determination to authorize valley fills as IPs, the COE would solicit and address the concerns of EPA in accordance with 40 CFR 313.3, the state agency responsible for water quality certification in accordance with 33 CFR 325.2 (b)(1), and the FWS in accordance with 33 CFR 325.2 (b)(5). The COE would be responsible for requiring compensatory mitigation to offset the loss of aquatic functions of streams and other waters of the U.S. proposed to be filled by the project, as determined primarily by the COE's stream functional assessment protocol performed on the mine site and mitigation sites. The COE's decision to authorize an IP for valley fills requires compliance with NEPA and therefore an EA and FONSI, or an EIS, as appropriate. OSM is the SMCRA authority in Tennessee and, since SMCRA permitting of any MTM/VF proposal in that state is a Federal action, NEPA requirements would apply and would be coordinated with the COE.

If the COE determines that the project may be authorized by NWP and the applicant has provided the information in accordance with the Notification requirement (General Condition 13), the COE would proceed with pre-construction notification (PCN) procedure. This procedure details the needed agency coordination, consideration of comments, compensatory mitigation and the administrative record. The applicant may proceed under NWP 21 only after receiving written authorization from the COE. [67 FR 2081] The NWP process does not require any additional NEPA analysis and does not result in an EA or EIS.

The SMCRA agency would be responsible for reviewing and processing surface coal mining permit applications as specified in the approved Federal or state surface mining regulatory program. An applicant for a SMCRA-based surface coal mining operation permit involving valley fills in waters of the U.S. would need to address conditions imposed by the COE on the proposed mining operations. Particularly the COE, in its IP review, would determine the number, size and placement of valley fills in waters of the U.S. and the SMCRA agency would explicitly condition the SMCRA permits to require operators to meet COE requirements.

Coordination would occur with the FWS and state fish and wildlife agencies regarding Federally- or state-listed T&E species and their habitat in the aquatic environment. State SMCRA agencies would further consider potential upland impacts from the mining proposal on T&E species and habitat in coordination with the FWS based on procedures outlined in the FWS 1996 BO on SMCRA. Under all alternatives, the FWS is responsible for reviewing and providing timely comments and suggestions to the COE and the appropriate SMCRA agency regarding the protection of Federally-listed T&E species and their habitat.

EPA would be responsible for timely review and comment to the COE on applications for CWA Section 404 authorizations involving valley fills in water of the U.S. for both PCNs under NWP 21 and for public notices under the IP process. The EPA is also responsible for the triennial review and approval of all State water quality standards and has a role in the state's air quality standards. EPA is jointly responsible with the COE for designating geographically-specified waters of the U.S. as "generally unsuitable for filling" under the advanced identification (ADID) process. EPA oversight

authority, including CWA Section 404(c) and (q), is unchanged for Alternative 1. FWS retains CWA Section 404(q) elevation options as well as Section 7 consultation requirements under ESA.

State agencies are provided the opportunity to review CWA Section 404 permits to determine whether the proposed operations can receive a state CWA Section 401 water quality certification [see Chapter II.C.4.a.2 for a discussion of water quality standards]. The states can either issue, deny, or waive a CWA Section 401 certification. A CWA Section 404 permit cannot be issued without a CWA Section 401 certification from the applicable state agency or a certification waiver. The COE may issue a permit that is conditioned upon the applicant receiving a CWA Section 401 certification before fills are placed in waters of the U.S. An application, deemed complete and likely to comply with the Guidelines, results in the final EIS or EA/FONSI and IP from the COE. SMCRA, CWA Section 401 and 402 permits from the appropriate agencies can follow the COE IP decision. State permit approval would contain adequate bond and conditions on accomplishing successful reclamation, including mitigation.

ESA--The COE would take the lead consulting with the FWS on compliance with ESA for IPs. The COE solicits comments from the FWS in accordance with 33 CFR 325.2 (b)(5) on the proposed project to place valley fills in waters of the U.S., with the objective of assuring protection of T&E species and their habitat. The COE would ensure the applicant takes the appropriate steps under the CWA in the configuration of valley fill disposal sites to address concerns and suggestions from FWS.

Subsequently, during the processing of a SMCRA surface mining permit application, the SMCRA regulatory authority would solicit comments from the state fish and wildlife agencies and the FWS regarding the protection of state and Federally listed T&E species, and their critical habitat. The COE initial consultation should have addressed those T&E species that could have been potentially affected by the construction of the valley fill; this consultation would be broadened to those potential effects from the mining operation in general.

NEPA--To expedite review, an applicant could prepare a preliminary EA to accompany each IP application. After making a tentative agreement with the mining company regarding the configuration of the valley fills associated with the project, the COE would notify the SMCRA agency of this agreement and the SMCRA review process would proceed, so that those sections of the permit review related to the placement of fill materials in waters of the U.S. can be completed. Following the submittal of a surface coal mining operation permit application to the SMCRA agency, the applicant would furnish the COE a copy of the administratively complete SMCRA application, and the COE would continue its determination under NEPA as to whether a EIS, or an EA/FONSI would be prepared. The COE would rely on data in the CWA Section 404 IP application, draft EA, and the SMCRA surface mining permit application to make this NEPA determination. In Tennessee, OSM would continue to be responsible for NEPA compliance for the SMCRA permit.

b.2. Memorandum of Agreement (MOA) and Field Operating Procedure (FOP)

Using the procedures in this MOA, the COE would establish initial limits on whether, how many, and what size valley fills are placed in waters of the U.S. through the evaluation required under the IP review process. The MOA would prescribe a permit process and sequence of review when surface coal mining applicants intend to place valley fills in waters of U.S. To the extent possible,

in accordance with Federal and state statutes and regulations, the initial determination of valley fill limits by the COE would precede approval from OSM or the appropriate state SMCRA regulatory authority. The COE would be responsible for processing the CWA Section 404 IP application, ensuring compliance with the CWA Section 404(b)(1) Guidelines; soliciting and considering comments from the public and other interested parties, including FWS regarding T&E species, and State Historic Preservation Officers (SHPOs) and others regarding the cultural and historic properties; conducting the public interest review; and complying with NEPA by doing a project-specific environmental assessment and/or, if warranted, environmental impact statement. The COE would continue to be responsible for applying the COE stream functional assessment protocol to determine required levels of off-site compensatory mitigation and assuring that the mitigation project is implemented as agreed upon by inspection, enforcement, and performance guarantees.

Under the MOA, the SMCRA regulatory authority would continue to be responsible for reviewing and processing surface mine permit applications under the approved Federal or state surface mining regulatory program. The SMCRA regulatory authority would, to the extent possible during the administrative completeness review, recognize the initial limits on the size, number and location of valley fills as determined by the COE. The review and approval of a SMCRA permit application would be coordinated with the tentative approval of the CWA Section 404 permit by the COE in order to minimize the need for SMCRA plan revisions related to the placement of fill material in waters of the U.S. OSM would advise a SMCRA permit applicant to obtain tentative COE approval of a mining proposal with fill sizes, locations, and offsetting mitigation prior to SMCRA approval. An applicant's SMCRA application must propose surface coal mining and reclamation activities that comport with the valley fill configuration (size, number, and location) required under CWA Section 404 by the COE. The SMCRA agency would condition SMCRA permits on compliance with applicable requirements under CWA Section 404 by the COE.

The SMCRA regulatory authority would continue to solicit and address comments from the U.S. Fish and Wildlife Service and state fish and wildlife agencies regarding Federally- or state-listed endangered or threatened species and critical habitat. State SMCRA agency decisions generally do not require individual NEPA reviews; but where OSM is the SMCRA authority (as in Tennessee) an individual NEPA review is required. In Federal program states, the OSM Field Office Director must determine if an EIS or an EA/FONSI is appropriate.

The principal purpose of this action is to improve permit coordination, reduce the overall process time and handling of data submissions and reviews and to make this a concurrent process to the extent that is possible. The secondary purpose of this action is to ensure that agencies give adequate consideration to all other activities occurring in a watershed as they make their environmental decisions. This action would further define and coordinate steps in the various permitting actions. For example, the participants could coordinate the various different public comment times under SMCRA, the CWA Section 404 program, and the CWA 402 program.

A FOP could be developed to serve as the guidelines manual that implements the MOA and provides administrative and procedural details not explained in the MOA. For a discussion on the development of a FOP, see Action 1.2.

c. Alternative 2: (Preferred Alternative) The Size, Number, and Location of Valley Fills in Waters of the U.S. are Determined by a Coordinated Regulatory Process

This alternative integrates and coordinates regulatory programs under the SMCRA and CWA as much as practicable, while maintaining independent decision making authority among the agencies. The coordinated regulatory program could be facilitated partly through: 1) the regulatory enhancements described in the OSM rule making in Actions 3.2 and 7; and 2) an MOA discussed below. A joint permit application could be a product of this alternative. With a joint application, the two regulatory processes effectively provide coordinated CWA and SMCRA permit processes under a Memorandum of Agreement (MOA). While the MOA would address a number of policy, administrative, and regulatory aspects of the respective permit processes, all agencies would continue to implement their existing regulatory responsibilities pursuant to the CWA and SMCRA.

Alternative 2 would require coordination among the COE, EPA, OSM, FWS, and their state counterparts in considering MTM/VF proposals. The COE would make case-by-case evaluations of site-specific impacts to determine the appropriate CWA Section 404 review process, in accordance with any NWP 21 regional conditions. Any existing regional conditions, such as an interim 250-acre minimal impact threshold, would continue to be implemented under this alternative until revoked or replaced. These regional conditions are described in the No Action Alternative [Chapter II.C.1.a.1.]. The evaluation would be based on proposal-specific information sharing and early coordination of these agencies. Facilitated sequencing of agencies' permitting activities would be key to better-informed decision making.

Action 1.2: The COE, through an MOA establishing coordination with other agencies, would make a case-by-case determination of the applicability of NWP 21, subject to a regional condition in certain geographic areas that valley fills proposed in watersheds larger than 250-acres would generally require IP processing. Those projects that do not result in minimal impacts to the aquatic ecosystem, both individually and cumulatively considering mitigation, would require an IP authorization.

c.1. Process and Regulatory Responsibilities

Process

This action proposes a CWA and SMCRA permit coordination process which would be coordinated with rulemaking to enhance or clarify the SMCRA process and a formal MOA to coordinate permit data submissions and review. The objective of this action is minimizing agency duplication of effort, eliminating paperwork and other regulatory burdens on applicants, as well as improving environmental decisions by evaluating mutual interests in anticipated permit requests on a watershed basis. The MOA could emphasize agency participation on a regular basis in pre-application meetings with industry in order, to the extent practicable, minimize permit deficiencies during the formal application review process. Such an MOA could also set forth the coordinated permit process in general; explain each agency's responsibilities and authorities in the process; frame the decision making and dispute resolution procedures; and establish joint SMCRA/CWA Field Operating Procedure (FOP). Elements of the MOA are described further below.

Under this action, development of a joint permit application would be explored by the SMCRA regulatory authorities, OSM, and the COE to satisfy both SMCRA and CWA information collection and analysis required for considering authorization of projects. The completed joint application would be submitted to the SMCRA agency and COE pursuant to respective statutory authorities and

responsibilities set forth in the MOA. For example, information and data relating to engineering aspects of the proposal such as slope stability would be reviewed principally by the SMCRA agency. Information relevant to both SMCRA and CWA authorization, such as fill minimization and flooding analyses, would be jointly reviewed and evaluated. The joint application is discussed in more detail, below.

As part of this action, before an application for an MTM/VF operation is prepared, the agencies would hold pre-application meetings to discuss preliminary mining plans. These types of meetings provide important feedback to potential applicants from the regulatory agencies and provide a forum for current information and technology exchange. Consequently, permit deficiencies may be minimized during formal application review and more pertinent details may be provided in the public notice.

Upon receipt of an MTM/VF proposal application, the SMCRA regulatory authority and COE would conduct a preliminary evaluation of the project alternative analysis, projected aquatic impacts, and proposed mitigation. This coordinated review would support the COE determination whether the applicant has or has not demonstrated the ability to offset unavoidable impacts to waters to a level deemed less than minimal. As a regional condition for certain geographic areas, any proposal for valley fills in watersheds larger than 250 acres would be presumed to require processing as an IP, unless rebutted with data and analyses.

If the COE concludes from this preliminary review that the applicant's plan appears to cause less than minimal impacts to waters of the U.S., the SMCRA agency would then complete the SMCRA permit process. This SMCRA permit process would, to the extent allowed by the proposed rule-making, include fill minimization and alternative evaluations. These SMCRA evaluations would be similar to and consistent with requirements of the CWA 404(b)(1) Guidelines, and accomplished, in part, through the regulatory revisions included in this alternative under Actions 3.2 and 7. This SMCRA review would establish the size, number, and location of fills for consideration under NWP 21 eligibility. The COE would then decide whether or not to authorize the NWP 21 activity unless the state has been authorized under a programmatic general permit to approve MTM/VF activities.

If the COE concludes from this preliminary review that the applicant's plan appears to cause more than minimal impacts to waters of the U.S., then the COE would initiate the IP process, including appropriate NEPA compliance reviews, described below. The COE IP process would initially establish the size number and location of valley fills in waters of the U.S. and the CWA and SMCRA permit review sequence would mirror that described in Alternative 1 [Chapter II.C.1.b.].

In evaluating an IP application, the COE public interest review may consider other information, such as blasting, post-mining land use, and revegetation, required for a SMCRA permit application. For instance, if the COE receives comments about anticipated problems from blasting, the COE may rely on the SMCRA evaluation of blasting matters to address the public comment and satisfy the public interest review.

MTM/VF projects must obtain several other authorizations prior to implementation. The NPDES permit (CWA Section 402) and state water quality certification (CWA Section 401) are important parts of the process for assuring water resource protection. Other approvals, such as the MSHA or state mine safety permits, are also required before mining can commence. The sequencing of these

permits should be addressed in the MOA and FOP to optimize the use of available information, maximize agency coordination, and minimize duplication for the applicant.

Regulatory Responsibilities

The COE would retain its regulatory authority under the CWA in carrying out the day-to-day reviews and decisions relative to Section 404 of the CWA as described in Chapter II.c.1.a.1. It would still determine compliance with the Section 404(b)(1) Guidelines; decide the applicability of IP (as described in Alternative 1) as opposed to NWP 21 (as described in Alternative 3) for any given proposal; and ensure compliance with NEPA relative to Section 404. The decision on the type of CWA Section 404 permit process would also be guided by any existing regional conditions, such as might be imposed in certain geographic areas, where fills in watersheds greater than 250 acres would generally be processed as IPs. The COE would make these determinations in partial reliance on the SMCRA information provided by the applicant as part of the joint permit application and based upon the pre-application and JPP meetings.

EPA would continue to jointly administer the Section 404 regulatory program with the COE through EPA's CWA oversight authority, including its elevation options under Section 404(q) and its veto authority under CWA Section 404(c). Similarly, the FWS would retain its elevation options under CWA Section 404(q), as well as its consultation requirements under Section 7 of the ESA.

OSM would also retain its SMCRA authorities, including oversight of state agencies implementing SMCRA. In addition, as described in Actions 3 and 7, OSM would consider additional rule-making under this alternative concerning data collection, impact predictions, alternative analysis, avoidance, fill minimization, and mitigation. Information provided to OSM under such rulemaking could also be provided to the COE, for consideration in addressing impacts to aquatic resources under CWA Section 404(b)(1) Guidelines.

State fish and wildlife agencies as well as state agencies that implement CWA Section 401 and delegated programs such as SMCRA and CWA Section 402 would continue to implement their programs concerning the protection or enhancement of natural resources.

ESA--The COE would take the lead consulting with the FWS on compliance with ESA for IPs. The COE would solicit comments from the FWS on the proposed project to place valley fills in waters of the U.S., with the objective of assuring protection of threatened or endangered species and their critical habitat. Upon notification of an IP application FWS provides the COE with a listing of T&E species within the project area. Consultation would occur during the COE processing of the CWA Section 404 permit application and in accordance with 33 CFR 325.2 (b)(5). The COE would ensure the applicant considers the appropriate steps under the CWA Section 404 in the configuration of MTM/VF activities affecting waters of the U.S. to address concerns and suggestions from FWS.

The SMCRA regulatory authority would consider the impacts of the proposal on state and Federally listed threatened or endangered species, and their critical habitat. These considerations stem from the ESA, 30 CFR 780.16, the FWS 1996 BO on the SMCRA program, and state law. The state fish and wildlife agencies and the FWS would be provided notice regarding the project. Comments solicited from FWS or state agencies may result in project revisions to exclude T&E habitat or minimize incidental take and include species-specific protection plans. While the initial COE consultation considers those T&E species that could potentially be affected by MTM/VF activities

affecting waters of the U.S., the SMCRA consultation would be broadened to those potential effects from the entire mining operation to T&E species and critical habitat.

For those projects determined to qualify for CWA Section 404 NWP 21, the SMCRA agency would solicit comments from the state fish and wildlife agencies and FWS regarding T&E species and critical habitat for the entire project. The SMCRA agency's early coordination with FWS and state fish and wildlife agencies on NWP 21 projects may reduce the time required to conduct consultation with the COE on T&E species or their critical habitat affected by MTM/VF activities in waters of the U.S. However, under Section 7 of the ESA, if the FWS does not agree with decisions reached by the SMCRA process, consultation on the CWA 404 action by the COE remains an opportunity to resolve permit issues.

NEPA–If the COE determines that project impacts are more than minimal, then the IP process must be followed. NEPA compliance is required for IPs through either an EA/FONSI or an EIS. To expedite review, an applicant could prepare a preliminary EA to accompany each IP application. Following the submittal of a surface coal mining operation permit application to the SMCRA agency, the applicant would furnish the COE a copy of the administratively complete SMCRA application, and the COE would continue its determination under NEPA as to whether a EIS, or if an EA and FONSI would be needed. The COE could rely on data in the CWA Section 404 IP application, draft EA, and the SMCRA surface mining permit application to make this NEPA determination.

If the COE determines that the project may be authorized using NWP 21, no further NEPA analysis is required because NEPA compliance occurs upon issuance of the NWPs every five years [http://www.usace.army.mil/inet/functions/cw/cecwo/reg/nw2002dd/index.htm].

SMCRA provides that state SMCRA permitting actions do not constitute a major Federal action requiring NEPA compliance. However, OSM prepared an EIS upon publication of the permanent regulatory program in 1979 and prepares NEPA compliance documentation for any subsequent major revision of the regulations. OSM cannot delegate NEPA responsibilities to the COE where/when OSM is the regulatory authority and issues federal permits (federal action). Separate, but supporting NEPA documents must be prepared by OSM and the COE for MTM/VF projects proposals in states such as Tennessee.

c.2. Memorandum of Agreement (MOA) and Field Operating Procedure (FOP)

The creation of an MOA and supporting FOP would assist in harmonizing CWA and SMCRA alternatives and stream impact data requirements. Under this MOA, the COE and OSM or the appropriate state SMCRA agency could coordinate their review of proposals for MTM/VF to the maximum extent possible, while retaining their respective independent decision making authorities. The MOA could provide a framework for coordination from project conception through pre-application meeting, application processing, inspection, enforcement, and bond release. Although the details of an MOA would be developed following selection of this alternative and a record of decision, the following section illustrates the types of issues, procedures, roles, and coordination that could be outlined or incorporated to promote joint initiatives among the regulatory agencies responsible for MTM/VF permitting, inspection, and enforcement:

- Identify the agencies, positions, and personnel to contact relative to MTM/VF applications;
- Promote:
  - a coordinated permit process;
  - regular pre-application and Joint Permit Processing (JPP) meetings;
  - standardized data collection to address identified gaps;
  - further refinement and implementation of the COE stream assessment protocol in evaluating permit applications [as described in Actions 9 and 12];
  - development of permit application assessment and mitigation procedures based on these data;
  - utilization of and networking the expertise of the various agencies;
  - development of FOPs;
  - efficient application sequencing;
  - facilitation of the coordinated processing by a lead agency;
  - development of decision-making and dispute resolution procedures; and
  - creation of a joint application;
- Contain information on existing regulatory tools for environmental protection of high value aquatic or other resources. Information could include the CWA ADID process, designated special aquatic sites, and "Aquatic Resources of National Importance" (EPA/COE CWA Section 404(q) MOA, August 1992), as well as lands designated unsuitable for mining under SMCRA;
- Identify the role of the CWA Section 404(c) and (q) elevation process in the coordinated approach;
- Describe the type of site-specific information necessary to justify formal written requests to the COE requesting NWP applications be processed as IP; and
- Encourage interagency site visits to gather site-specific resource information on which to base impact predictions, allowing the agencies to make more informed decisions.

The MOA could be announced and explained with the preparation and dissemination of a public outreach brochure. This brochure would provide details of the coordinated permit process, explain how the public can provide comments on specific proposals and how these comments can be made more effective, and present in general the various options that could be taken to mitigate impacts from mining projects, including compensatory mitigation actions. Aquatic resource functional assessment procedures, along with the details of the coordinated permit process, would be disseminated to the regulated community and public as part of outreach. The brochure would also provide any status reports related to the implementation of the selected alternative in this EIS and would therefore be updated as needed.

The Joint SMCRA/CWA FOPs would serve as the guidelines manual that implement the MOA and provide administrative and procedural details not explained in the MOA. A model FOP could be developed to maintain the highest level of consistency possible. However, the FOP could be modified as necessary to account for any unique programmatic differences between states. FOPs could be implemented by one or more COE Districts in conjunction with appropriate Federal and state agencies.

The FOP could establish a protocol for facilitating the coordinated permit process and convening JPP meetings, which would be held principally in advance of the submission of permit applications,

and be convened as needed to consider one or more proposals. FOPs could describe the agreed-upon agency contacts and protocol for coordination of agencies' information gathering and sharing, permit sequencing, assessment, public notice, dispute resolution, or other permit, inspection, and enforcement procedures.

c.3. Joint Application

An improved permit coordination process could lead to the development of a joint application. This application could enhance the coordinated regulatory process by serving as the platform for evaluation of compliance with SMCRA and CWA Section 401, 402, and 404 programs. This joint permit application would allow an applicant, at one time and on one application form, to supply all the information and analysis necessary for a regulatory agency and/or the interested public to evaluate a proposed mine project.

The information submitted by the permit applicant would be distributed to the regulatory agencies according to their respective statutory authorities. For example, information and data relating to engineering aspects of the proposal such as slope stability, revegetation, blasting, roads, etc. would still be reviewed principally by the SMCRA agency. Information relevant to both SMCRA and CWA authorization, such as fill minimization, upland alternatives, mitigation, etc., would be collaboratively reviewed and evaluated.

A critical aspect of the CWA Section 401, 402, and 404 is to provide data and make impact predictions analyzing the effects of a proposed project on water quality. Similarly, a feature of the SMCRA permit requires baseline data and analysis of the hydrologic consequences of surface coal mining proposals. These data and predictions for MTM/VF are obvious candidates for assembly in a joint permit application. Data compiled from the joint application could be exported into the GIS database mentioned in Action 14 and used for SMCRA CHIAs, CWA Section 404 cumulative analyses, CWA Section 402 discharge permit analyses, and CWA Section 401 water quality certifications.

Other elements to consider for a joint permit application are requirements to provide narrative, data, and analytical information demonstrating the following:

- the least environmentally-damaging practicable alternative valley fill locations were considered;
- unavoidable impacts will be minimized by placing as little material as possible in valley fills;
- unavoidable impacts to the waters of the U.S. can be successfully offset by a comprehensive mitigation proposal; and
- an construction cost estimate for mitigation components establish requisite bond amounts.

Although a single permit application is envisioned through this action, each agency would continue to be responsible for ensuring that all statutory and regulatory responsibilities set forth in both the SMCRA and CWA regulatory programs are met. However, common data elements in a joint application suggest the efficiency of common analytical approaches. Mutual reliance on these analytical results could minimize conflicts between agencies relative to decisions on the same

proposal. The joint permit application and standardized data could provide a basis for one agency to substantiate and confidently utilize findings made by another agency.

d. Alternative 3: The Size, Number, and Location of Valley Fills in Waters of the U.S. are Determined by an Enhanced SMCRA Regulatory Program

Under this alternative, the SMCRA regulatory authority would be the lead reviewing and facilitating agency. This could be accomplished through regulatory enhancements as part of rule making described in Actions 3.3 and 7 and an MOA similar to that described in Action 1.2. With the current and any additional rule-making enhancements in place, the SMCRA regulatory authority would conduct the initial MTM/VF application review to consider whether activities proposed in waters of the U.S. are consistent with the stream characterization, avoidance, and minimization requirements of the CWA Section 404(b)(1) Guidelines.

As with Alternative 2, Alternative 3 would require interagency coordination, sequenced permitting, and could include development of a joint SMCRA/CWA application. However unlike Alternatives 1 and 2, this alternative includes a procedural presumption that MTM/VF proposals should generally begin processing for CWA Section 404 authorization under NWP 21. This approach is based on the ability of the COE to rely on: 1) the SMCRA review information; and 2) the adequacy of the applicant's proposed mitigation of unavoidable impacts. In limited circumstances where the initial SMCRA review provides information relevant to a determination whether unavoidable impacts to waters of the U.S. cannot be mitigated below minimal adverse effects, the SMCRA regulatory authority would provide that information to the COE and the COE will determine whether to initiate its IP process.

Action 1.3: The SMCRA regulatory authority, through an MOA establishing formal coordination with other agencies, would initially review proposed MTM/VF activities and provide to the COE a recommendation and supporting information on whether the activities might result in more than minimal impact to waters of the U.S.

d.1. Process, Regulatory Responsibility, and Coordination

Process

This action proposes that the SMCRA program would lead a coordinated review process for MTM/VF proposals. Like Action 1.2, this action would include an MOA outlining the role of each agency in the regulatory process. Building upon a number of SMCRA program improvements, this action would coordinate data submissions and review. To further advance this collaborative regulatory theme OSM would consider, to the extent authorized under SMCRA, adopting regulations concerning relevant CWA Section 404 data collection, impact prediction, and alternative analysis, including avoidance and minimization (see Actions 3.3 and 7). Any such information and analysis by the SMCRA agency regarding impacts on aquatic resources and the hydrologic balance would promote compliance with the CWA Section 404(b)(1) Guidelines. Similar to the concept described under Alternative 2, the overall MTM/VF regulatory process could become more consistent in Alternative 3 with the proposed coordinated permit application review process and a possible joint application.

OSM rules effectively require that state SMCRA programs be no less effective than Federal requirements. Therefore, subsequent to adoption of any OSM final rules, states would develop similar requirements or OSM would take appropriate action to assure the revised features of the SMCRA regulatory programs are applied to MTM/VF. These regulatory revisions would include increased aquatic resource baseline data as well as impact and alternative analyses to ensure that the location of MTM/VF fills would be based on the least environmentally-damaging practical alternative.

The SMCRA regulatory authority would conduct the initial review of the surface coal mining and reclamation operation application. Following this review, the COE would be notified of the aquatic impact review (size, number and location of fills). If the COE verifies that the results of the SMCRA review for the proposed coal mining, reclamation, and mitigation activities would likely result in less than minimal adverse effect (individually and cumulatively) to waters of the U.S., a NWP 21 authorization would follow. However, the IP process would be required when the COE considers the results of the SMCRA review and: 1) agrees with the SMCRA authority that the proposed project would result in more than minimal impacts to waters of the U.S or, 2) disagrees with the SMCRA authority that the proposed project would result in less than minimal impacts.

As in Alternative 2, should an IP be necessary, the COE would determine whether information supplied in the SMCRA application is sufficient to satisfy the alternatives analysis required by the CWA Section 404(b)(1) Guidelines and the public interest review. The COE would also decide whether an EA or EIS is required for NEPA compliance under CWA Section 404. Any additional information beyond that contained in the SMCRA application needed to satisfy CWA Section 404 requirements would be requested and processed by the COE.

The appropriate SMCRA regulatory authority would initiate the processing of the joint application under Alternative 3. This application could be jointly developed by OSM with each SMCRA program state and the COE (see discussion of joint application in Action1.2). Such an application would contain all the data necessary to allow informed decisions regarding the approval or denial of the SMCRA permit and the CWA Section 404 authorization. As in Alternative 2, a joint or enhanced permit application would serve to provide a mechanism through which an applicant could provide, in one application form, all the information and analysis necessary for a regulatory agency and/or the interested public to evaluate a proposed mine project. Although a single permit application is envisioned for this action, each agency would continue to be responsible for ensuring that all statutory and regulatory responsibilities set forth in both the SMCRA and CWA 404 regulatory programs are met.

Most states, through either the CWA Section 401 certification process and/or other state water quality statutes, require some form of compensatory mitigation. However, SMCRA authorities do not have the statutory basis to require off-site compensatory mitigation. Reclamation of a mine site as a component of mitigation is discussed in Chapter II.C.6.a.2. Under this alternative, the SMCRA agency would work closely with the COE during pre-application meetings and formal application reviews to determine the extent of compensatory mitigation needed to offset any adverse effects of MTM/VF to waters of the U.S. The COE would augment the SMCRA permit requirements with off-site mitigation in the absence of state authority to require sufficient off-site mitigation.

Regulatory Responsibilities

The regulatory responsibilities described in Actions 1.1 and 1.2 are common to all the alternatives. However, the lead agency for each responsibility under the action could vary under each alternative. For instance, under this Alternative and Alternative 2, state SMCRA authorities or OSM could require applicants to use the COE stream assessment protocol and evaluate the functional level of the waters of the U.S. that would be impacted. This contrasts with Alternative 1 in which the COE would require such an evaluation. In addition, Action 1.3 anticipates that the application could identify and address on- and off-site mitigation project opportunities. The SMCRA authorities could consider all relevant mitigation proposals when making requisite SMCRA findings regarding minimized impacts to the hydrologic balance, fish, wildlife, and related environmental resources. Any mitigation not within jurisdiction of the SMCRA regulatory agency would be addressed by the COE upon NWP 21 authorization. The SMCRA permit would be conditioned on compliance with the COE authorization, including any required mitigation.

This alternative would meet the purpose of the CWA Section 404 general permit process, while retaining the ability of the COE to take discretionary authority on any project and process it as an IP. When the COE re-authorized NWP 21 on January 15, 2002, changes were made to ensure proper focus of NWP 21 and to make certain adequate aquatic resource mitigation is required. The COE would retain its authority to require appropriate onsite and offsite compensatory mitigation to offset unavoidable impacts to aquatic resources. Due to this enhanced process, it is expected that the COE would only infrequently exert discretionary authority to require IPs, for which either an EA/FONSI or EIS is required. NEPA analysis by the COE or OSM in Federal program states is described in Action 1.1. and would not change for Action 1.3. The IP process and alternatives analysis are described in Alternative 1. For those circumstances when IPs are required under Alternative 3, the IP process described in Alternatives 1 and 2 would not differ from the IP process under Alternative 3.

As in Alternative 1, the COE would solicit and address EPA and state water quality agency concerns. This alternative is no different than the other alternatives in relying on state water quality certification (CWA Section 401). See Chapter II.C.4.a.2. for a discussion of water quality certifications. EPA oversight authority, including CWA Section 404(c) and (q), is unchanged for Alternative 3. FWS retains CWA Section 404(q) elevation options as well as Section7 consultation requirements under ESA (described in Action 1.2).

As discussed in the No Action Alternative, states could assume the responsibility for all or part of CWA Section 404 authority (Chapter II.C.1.a.2). Identical to Alternative 2, it is not critical under Alternative 3 that a state seek an SPGP or full CWA Section 404 assumption, inasmuch as the COE retains discretion to process and issue CWA Section 404 permits in the absence of state involvement. States could consider adopting laws requiring mitigation and other provisions consistent with the CWA Section 404 program. The COE requirements for mitigation are detailed in Chapter II.C.6.a.1. This could allow state agencies under an SPGP to specify the extent of onsite and offsite mitigation satisfactory to the Federal program. This could establish the programs that would allow them to apply and be issued an SPGP under the COE CWA Section 404 regulatory program. Once issued, SPGPs allow a state to authorize fills into waters of the U.S. within the conditions and limitations imposed by the SPGP. These SPGPs could minimize duplication of CWA Section 404 regulatory control, yet retain the protection measures for the aquatic environment under CWA Section 404.

d.2. Memorandum of Agreement (MOA) and Field Operating Procedure (FOP)

An MOA and FOP between the COE and appropriate SMCRA regulatory authorities would establish lead and coordination role and implementation procedures so that SMCRA application reviews provide information and aquatic impacts analyses to facilitate subsequent CWA Section 404 program decisions. As in Action 1.2, the MOA and FOP could describe responsibilities and details for matters such as permit application review, CWA Section 404(b)(1) Guidelines alternatives analysis, compensatory mitigation, permit sequencing, issue resolution, and possible development of a joint permit application.

The principal purpose of the MOA and FOP is to improve consistency and permit coordination, reduce the overall process time and handling of data submissions and reviews, and to the extent possible, make this a concurrent process. A FOP would further define and coordinate steps in the various permitting actions. For example, the participants could coordinate the different public comment times under SMCRA, and the CWA Sections 401, 402 and 404 programs.

2. Government Efficiency, Sub-issue: Consistent/Compatible Definitions for Stream Characteristics and Analyses

Both the CWA and SMCRA programs regulate impacts to streams. The programs contain defined stream-related terms and methods or protocols for identifying and delineating stream types and characteristics. The programs employ certain analyses and protections based, in part, on the type and character of a stream or stream segment. Within the study area, headwater stream segments are generally represented by three types of flow characteristics--ephemeral, intermittent, and perennial. Characterizations of streams based on water quality range from "impaired" to "outstanding natural resource waters" with various categorizations in between. In some cases, similar or identical terms are defined somewhat differently by the individual regulatory programs. Methods or protocols for identifying or delineating the same or similar stream types and characteristics may also vary by program.

The CWA, SMCRA, and selected state stream definitions, protocols, and monitoring requirements were considered in the development of this EIS. Discussions of these program features can be found in Chapters II.C.3. [Direct Stream Loss], II.C.4. [Stream Impairment], II.C.6. [Stream Habitat and Aquatic Function] and II.C.7 [Cumulative Impacts]. The various regulatory programs each have their own approaches to considering headwater streams, aquatic resources and related functions. Activities in headwater streams are regulated utilizing stream delineation, assessment, monitoring, classification, description, determining baseline, and other approaches. These approaches often differ from agency to agency, in part due to the respective regulatory focus and responsibilities of each agency. Use of these approaches sometimes yield compatible information and regulations; however, other times the product of a particular approach is only useful to the agency specifying the approach. Such inconsistent approaches may lead to confusion, uncertainty, and duplication of effort for all involved with regulation of headwater streams.

The fact that each program typically requires a field visit and stream reconnaissance illustrates the potential for duplication of effort by the regulatory agencies, applicants, and stakeholders. An example of this potential for inconsistency is the determination as to the jurisdictional extent of the headwater streams to be analyzed and protected. Stream delineation is central to the COE CWA Section 404 consideration of impacts to waters of the U.S. As discussed throughout this EIS, when a valley fill is proposed in "waters of the U.S.," the COE conducts a site visit to identify where a

headwater stream begins. The COE site visit allows a determination of the extent of waters of the U.S. based on location of a "defined bed and bank," or "ordinary high water mark." The COE also examines quality of the aquatic resources to be impacted.

Dissimilarly, SMCRA requires an analysis of mining within 100 feet of an intermittent or perennial stream to determine whether the proposed mining would have an adverse effect on specified environmental resources. Under SMCRA, an intermittent stream is a stream or reach of stream that is below the local water table for at least some part of the year, and it obtains flow from both surface runoff and groundwater discharge. A perennial stream flows year-round. In order for the SMCRA regulatory authority to analyze the mining, stream delineation procedures relying upon field data and observations are utilized. Obviously, identification of the intermittent and perennial characteristics of streams for SMCRA purposes does not delineate waters of the U.S. for the COE.

Another example of a source of uncertainty is the lack of a single definition for the term "water table." Both the CWA and SMCRA refer to the term "water table" when defining ephemeral and intermittent streams. However, each regulatory authority makes its own independent determination of where the water table is for every headwater stream.

Stream definitions used by regulatory programs to analyze a proposed project are key to making findings that project impacts do not exceed a particular program threshold. In considering the impacts of a proposed project in a headwater stream, the SMCRA program considers whether there will be an "adverse effect" on certain environmental resources. The CWA program considers whether the impacts associated with the project will be "more than minimal," but result in "less than significant degradation" to waters of the U.S. "Adverse effect" and "significant degradation" appear to be substantially similar thresholds. During the protracted, independent reviews of MTM/VF proposals, uncertainty and confusion can occur because of nuances inherent to the various regulatory programs. Moreover, since separate agencies apply the thresholds in different contexts, there is potential for agencies to reach distinctly different conclusions regarding a proposed project. Because the reviews necessitate significant time and resources to complete, conflicting results are not a desirable outcome. Applying definitions of other terms, such as "material damage," "impairment," and "cumulative impacts," could further contribute to delay and duplication in the review of MTM/VF project applications.

a. No Action Alternative: The Regulatory Program Today

Stream segment and other stream characteristic definitions (e.g. ephemeral, intermittent, perennial, defined bed and bank, ordinary high water mark, jurisdictional waters) vary among Federal agencies, from state to state, and within states. This variability is illustrated in a tabular listing of terms at the end of Appendix B. CWA and SMCRA stream definitions, along with protocols and monitoring requirements, were considered in the EIS and related discussions can be found in Chapters II.C.3., II.C.4., II.C.6. and II.C.7.

Some factors regulatory authorities use to apply the terms ephemeral, intermittent or perennial are:

- the persistence of stream flow
- a combination of the flow and the location of the local water table relative to the stream channel
- watershed size surrogate

- channel form
- biological parameters.

These differing ways to delineate stream segments sometimes create an inconsistent regulatory framework among the various states and confusion among the regulated and regulators. In addition the alternate methods may cause incompatible results which must be reconciled by the various regulatory authorities. This reconciliation of the findings by the various agencies is done on an ad hoc basis.

During preparation of this EIS, field studies were undertaken to identify an areal or biological surrogate for case-by-case delineations of stream segments. Stream surveys were conducted to correlate specific macroinvertebrate types with stream segment flow characteristics. Macroinvertebrates were collected at regular intervals downstream of a point where flow began in 37 head water streams in West Virginia. The presence of certain macroinvertebrates requiring water for a particular term of aquatic life stage were evaluated to see if statistical correlation would afford a basis for classification of a stream segment or watershed size as ephemeral, intermittent, or perennial. However, these efforts failed to produce an adequate sample population or suitable correlation for a rational, reliable, or acceptable substitute for case-by-case determinations that could satisfy various regulatory programs.

a.1. CWA Section 404

The extent of the CWA jurisdiction is defined by *waters of the U.S.* [33 CFR 329.4 (c); 40 CFR 232.2]. The COE regulations, unlike EPA regulations, contain a definition of *ordinary high water mark*, established by the fluctuations in water and indicated by physical characteristics such as shelving, destruction of terrestrial vegetation, or a defined bed and bank [33 CFR 328.3(e)].

Ephemeral, intermittent, and perennial streams are defined in the NWPs issued by the COE in January 2002 [67 FR 2094-2095]. These definitions are based on the absence or presence of a groundwater component for providing stream base flow. The type of stream in which a fill may be located is important because, for some NWPs, there is a 300-foot limitation on fills in perennial streams, a 300-foot limitation on intermittent streams (although a waiver may be obtained) and no current limit on the length of ephemeral stream which may be filled. There is no preferred methodology for determining the presence of groundwater, and the COE districts have used experience and best professional judgment in these determinations.

a.2. SMCRA

Ephemeral, intermittent, and perennial streams are defined in 30 CFR 701.5. A distinction between the three classifications is the flow. A perennial stream "flows continuously," a intermittent stream "obtains its flow from both surface runoff and groundwater discharge," and a ephemeral stream "flows only in response" to precipitation of melting snow or ice. The SMCRA stream buffer zone rule applies to two of these types of stream segments. The rule requires an analysis of mining within 100 feet of an intermittent or perennial stream to determine whether the proposed mining would have an adverse effect on specified environmental resources. SMCRA regulatory authorities stream definitions for ephemeral, intermittent, and perennial have been deemed as effective as the SMCRA rules. There is no OSM preferred field methodology for determining the type of stream segment and the practices vary from state to state. For instance, in West Virginia, the point where the stream

segment changes from ephemeral to intermittent is located by a fie) contributing to a watershed tributary.

a.3. Other Regulatory Programs

Other CWA regulatory programs require the application of definitions, assessments, protocols, etc. in the evaluation of activities likely to impact the resources associated with headwater streams. These programs include CWA Section 402, including NPDES, TMDL, antidegradation and state water quality certifications (CWA Section 401). The programs generally require the collection of stream information, but lack avenues to provide for the exchange and interchange of the base characterizations.

b. Alternatives 1,2 and 3

Action 2: The Federal and/or state agencies would develop guidance, policies, or institute rule-making for consistent definitions of stream characteristics, as well as field methods for delineating those characteristics.

Federal and state regulatory authorities would work with industry and environmental stakeholders and academia scientists to establish science-based methods for definition and delineation of stream characteristics (such as ephemeral, intermittent, and perennial stream segments) found in 30 CFR 701.5 and other stream-related definitions (e.g., waters of the U.S., navigable, wet weather streams, etc.) used in the CWA and implementing regulations. Those stream characteristics with particular significance in the regulatory programs could be addressed through rule-making to establish common definitions in the appropriate CFR for SMCRA and CWA. The Federal and state regulatory authorities would jointly prepare technical guidance on when and how to properly identify stream characteristics in the field. The field procedures for delineating stream characteristics could be a part of the FOP, described in II.C.1.

For Alternative 1, COE will facilitate this undertaking. For Alternative 2, EPA will facilitate this undertaking. For Alternative 3 OSM will facilitate this undertaking.

3. Direct Stream Loss

The importance of headwater streams to the ecological setting in the landscape was documented and evaluated for this EIS [Chapter III.C: Appalachian Aquatic Systems and Appendix D: Headwater Stream Symposium]. Technical studies were conducted on the scope of the direct impacts to streams from mountaintop mining and valley fills [Appendix I: Cumulative Impact Study and Chapter III.K: Fill Inventory]. Eight potential impact factors are identified and discussed in Chapter III.D.1. The factors attributable to direct stream loss discussed below are the following: loss of linear stream length; loss of biota under fill footprint or from mined stream areas; and loss of upstream energy from buried stream reaches. These direct impacts may result in stream impairment downstream. Those factors, discussed in Section 4, are the following: changes in downstream thermal regime; changes in downstream flow regime; changes in downstream chemistry; changes in downstream sedimentation; and effects to downstream biota.

Streams may be directly impacted by mountaintop mining principally by mining through the stream, constructing valley fills on top of streams, and locating support activities (haulage roads and

sedimentation control structures) within the stream. All of these activities will, at least temporarily, eliminate stream biota and the ability of these organisms to synthesize organic material to provide life supporting organic energy for down stream reaches. Approximately 1200 miles of continually or intermittently flowing streams (or 2 percent of the 59,000 miles of streams in the study area) have been directly impacted by all surface mining activities in the last ten years. About 724 miles of stream, which is about 1.2 percent of the streams in the study area, were covered by valley fills from 1985 to 2001. [Chapter III.K.2].

Scientific information outside of the EIS study area indicates that headwater streams contribute energy and nutrients to the downstream aquatic ecosystem. Studies indicate that elimination of macroinvertebrates in headwater streams causes a temporary reduction in energy and nutrients downstream. Macroinvertebrate recovery appears to be facilitated provided sufficient food sources and aquatic habitat are available. Some researchers hypothesize that tree removal during mining reduces macroinvertebrate food sources and, combined with the loss of biota in the mined and filled area, may reduce contributions of coarse and fine organic particulate matter to the aquatic systems downstream. The extent to which valley fills reduce energy (organic carbon) resources that may be used by downstream aquatic communities is not well known. There were no studies conducted within the EIS study area to measure organic carbon because of the significant cost and the absence of widely-accepted, standardized monitoring and testing procedures.

One of the principal goals of this EIS is to explore ways to minimize the adverse impacts on streams from mountaintop mining/valley fill construction. This section focuses on the existing regulatory controls and alternatives to these controls that have a bearing on the direct loss of streams as the result of valley fill construction and various options available to minimize these losses.

a. No Action Alternative: The Regulatory Program Today

Both SMCRA and CWA place a high value on stream protection but both of these programs recognize that incursions and disturbances of streams may be unavoidable. The purpose of the CWA is to protect and restore the chemical, physical, and biological integrity of the nation's waters. Section 404 of the CWA regulates the placement of fills in those waters, which limits the direct loss of streams through the permitting process.

The CWA Section 404(b)(1) Guidelines are the criteria used to evaluate proposals for actions that may result in direct stream loss [40 CFR 230.10]. These criteria address alternatives that avoid direct stream loss; maintain water quality; prevent significant degradation; and minimize and mitigate impacts to the aquatic environment. These criteria serve to mitigate unavoidable stream loss from fills and meet the purpose of the CWA.

The purpose of SMCRA is to balance environmental protection during surface coal mining operations with the nation's need for energy. SMCRA cannot supercede the CWA with respect to controls of fill placement in waters of the U.S. Further, CWA Section 515(b)(10) requires minimization of adverse impacts to the hydrologic balance within the permit area and prevention of material damage to the hydrologic balance offsite. This performance standard for protection of the hydrologic balance includes streams and is consonant to the purposes of the CWA.

a.1. CWA Section 404

The CWA governs the "discharge" of "pollutants" into "navigable waters," which are defined as "waters of the United States." Specifically, Section 301 of the CWA generally prohibits the discharge of pollutants into waters of the U.S., except in accordance with the requirements of one of the two permitting programs established under the CWA; Section 404, which regulates the discharge of dredged or fill material; or Section 402, which regulates all other pollutants under the National Pollutant Discharge Elimination System (NPDES) program. CWA Section 404 is primarily administered by the COE, or states/Tribes that have assumed the program pursuant to CWA Section 404 (g), with input and oversight by EPA. In contrast, CWA Section402 and the remainder of the CWA are administered by EPA or approved states or Tribes. The CWA defines the term "pollutant" to include materials such as rock, sand, and cellar dirt that often serve as "fill material." The CWA, however, does not define the terms "fill material" and "discharge of fill material," leaving it to the agencies to adopt definitions consistent with the statutory framework of the CWA.

Interpretation of the CWA Section 404 by EPA, COE, and other stakeholders has historically varied. Prior to 1977, both the COE and EPA had defined "fill material" as "any pollutant used to create fill in the traditional sense of replacing an aquatic area with dry land or of changing the bottom elevation of a water body for any purpose. . ." [40 FR 31325 (July 25, 1975); 40 FR 41291 (September 5, 1975)]. In 1977, the COE amended its definition of "fill material" to add a "primary purpose test," and specifically excluded from that definition, material that was discharged primarily to dispose of waste. [42 FR 37130, July 19, 1977.] This change was adopted by the COE because it recognized that some discharges of solid waste materials technically fit the definition of fill material; however, the COE believed that such waste materials should not be subject to regulation under the CWA Section 404 program. Specifically, the COE definition of "fill material" adopted in 1977 reads as follows:

> "(e) The term 'fill material' means any material used *for the primary purpose* of replacing an aquatic area with dry land or of changing the bottom elevation of an [sic] water body. The term does not include any pollutant discharged into the water primarily to dispose of waste, *as that activity is regulated under Section 402 of the Clean Water Act*." [33 CFR 323.2(e) (2001)(emphasis added).]

EPA did not amend its regulations to adopt a "primary purpose test" similar to that used by the COE. Instead, the EPA regulations at 40 CFR 232.2 defined "fill material" as "any 'pollutant' which replaces portions of the 'waters of the United States' with dry land or which changes the bottom elevation of a water body *for any purpose"* (emphasis added). The EPA definition focused on the effect of the material (an effects-based test), rather than the purpose of the discharge in determining whether it would be regulated by CWA Section 404 or CWA Section 402. Unlike the definition of "fill material," the EPA and COE existing regulations defining the term "discharge of fill material" were substantively identical.

While in practice some COE Districts and EPA Regions have developed regionally consistent approaches for determining whether proposed activities would result in a discharge of fill material, national uniformity would ensure better environmental results. Moreover, two judicial decisions, Resource Investments Incorporated v. U.S. Army Corps of Engineers, 151 F. 3d 1162 [9th Cir. 1998] ("*RII"*) and Bragg v. Robertson, [Civil Action No. 2:98–636, S.D. W. Va.], vacated on other grounds, 248 F. 3d 275 [4th Cir. 2001] ("*Bragg*"), indicate that the differing EPA and COE definitions can result in judicial decisions that further confuse the regulatory context. In April 2000,

the COE and EPA proposed a rule, finalized in May, 2002, to promote clearer understanding and application of the CWA regulatory program [65 FR 21294 – 95 and 67 FR 31129-43, respectively].

The COE and EPA final rule reconciled the CWA Section 404 regulations defining the term "fill material" and amended the definitions of "discharge of fill material." The final rule defines "fill material" in both the COE and EPA regulations as material placed in waters of the U.S. where the material has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of a water. The final rule amends the "discharge of fill material" to include the following: 1) "placement of fill material for construction or maintenance of liners, berms, and other infrastructure associated with solid waste landfills; and 2) placement of coal mining overburden." The final rule clarified the CWA Section 404 regulatory framework consistent with existing regulatory practice. Direct stream loss as a result of valley fills requires authorization under CWA Section 404 by the COE.

The COE uses the CWA Section 404(b)(1) Guidelines in evaluating proposals to convert waters of the U.S. to dry land [Chapter II.C.1.a.1.]. Applicants are required to demonstrate they have considered upland alternatives that would avoid streams; that if avoidance is not possible, fills have been minimized to the extent practicable; that the proposal would not result in significant degradation to waters of the U.S.; and that proposed unavoidable impacts to waters can be offset by appropriate mitigation to compensate for the aquatic ecosystem functions lost in conversion. If fills in waters of the U.S. result in no more than minimal impact, individually and cumulatively, including compensatory mitigation, authorization can be by a NWP, which is an expedited review process. If the fills have more than minimal impact, the proposals undergo a more detailed review under the IP review process. Although both permit processes require compensatory mitigation for direct stream loss, the combination of an expedited review and the cost of compensatory mitigation result in projects designed with less stream loss. As a result, there is an incentive for applicants to propose projects that would be eligible for NWPs. The process the COE uses to determine minimal impacts is discussed Chapter II.C.1.a.1.

The Special Aquatic Site provisions of the CWA Section 404(b)(1) Guidelines [40 CFR 230.10] can also protect against stream loss. These sites are geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem of the region. Special Aquatic Sites currently include wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes. Headwater streams in the Appalachian Highlands often exhibit riffle and pool complexes and other aquatic habitats that are categorized as Special Aquatic Sites. These sites may warrant comprehensive functional assessments of the stream environment and more rigorous alternatives analyses as part of the permit application process; and the COE may rely on the results of these evaluations to deny valley fill permit applications or employ them to develop measures to minimize adverse environmental effects of those permits issued.

For fills to be authorized in special aquatic sites, the applicant must demonstrate that the project is water dependent or rebut the presumption that there are practical upland alternatives. Valley fills are not "water dependent." Consequently, if a valley fill is proposed in a special aquatic site, upland alternatives with less adverse impacts on the aquatic ecosystem are presumed to exist unless clearly demonstrated otherwise by the applicant.

The COE and EPA also have the ability in a process referred to as an Advanced Identification of Disposal Sites (ADID) to identify special aquatic areas generally unsuitable for fill. The process is identified under Subpart I of the CWA Section 404(b)(1) Guidelines (Planning to Shorten Permit Processing Time). The ADID process, although never having historically been used in association with valley fills from mountaintop mine sites, is a tool to inform potential applicants about the relative ease or difficulty they can expect in applying for a permit to fill within the designated waters, and consequently serves as an incentive to design projects in such a way as to avoid and minimize impacts to those waters.

a.2. SMCRA

Several SMCRA statutory provisions and complementary regulations prevent or minimize direct stream loss. With a few exceptions, SMCRA requires that all surface coal mining and reclamation operations return overburden, spoil, and waste material to the mined area to reconstruct the approximate original contour. Only when the operator demonstrates that, due to the expansion of volume of overburden, spoil, and waste the material removed from the mining sites is more than sufficient to reconstruct the approximate original contour, can this excess spoil material be placed outside the mined area. This excess material must be shaped and graded to prevent slides, erosion, and water pollution [30 U.S.C. 1265 (b)(3)]. By minimizing the volume of excess spoil material, the potential for direct stream loss is also minimized.

SMCRA also requires that disturbances to prevailing hydrologic balance be minimized at the mine-site and off-site areas [30 U.S.C. 1260 and 1265(b)(10)]. The complementary Federal regulations at 30 CFR 816.41 further require that surface mining and reclamation activities prevent material damage outside of the permit area [30 CFR 816.41].

In addition, SMCRA requires that surface coal mining and reclamation operations use the best technology currently available to minimize disturbances and adverse impacts on fish, wildlife and related environmental values, and enhance such resources where practicable. [paraphrase of 30 U.S.C. 1265(b)(24)]. The complementary Federal regulations at 30 CFR 816.97(f) requires that operators conducting surface mining activities avoid disturbances to, enhance where practicable, restore, and replace wetlands and riparian zones along rivers and streams. These regulations additionally require that surface mining activities avoid disturbances to, enhance where practicable, or restore habitats of unusually high value for fish and wildlife.

Another SMCRA provision which may protect against stream loss is the stream buffer zone (SBZ) rule at 30 CFR 816.57. The SBZ rule stems from SMCRA Section 515(b)(10) related to minimization of the adverse impacts to the prevailing hydrologic balance, and SMCRA Section 515(b)(24) relating to minimization of adverse impacts on fish, wildlife, and related environmental resources. For protection of the hydrologic balance, the primary focus of the SBZ rule is on preventing addition contributions of suspended solids to stream flow outside of the permit area. Both SMCRA Sections 515(b)(10)(B)(i) and (24) require the use of best technology currently available (BTCA). The principal purpose of the SBZ rule is to implement BTCA to minimize impacts to the hydrologic balance, fish, wildlife, and related environmental resources. The SBZ rule limits incursions into areas around streams with exceptions as determined by the SMCRA regulatory authority. The SBZ rule states:

> (a) No land within 100 feet of a perennial or intermittent stream shall be disturbed by surface mining activities, unless the regulatory authority specifically authorizes surface mining activities closer to, or through, such a stream. The SMCRA regulatory authority may allow such activities only upon finding that–
>
> > (1) Surface mining activities will not cause or contribute to a violation of applicable State or Federal water quality standards, and will not adversely affect the water quantity and quality or other environmental resources of the stream;
> >
> > (2) if there will be a temporary or permanent stream-channel diversion, it will comply with specific requirements applicable to the construction of diversions.
>
> * * *

The principal purposes of the stream buffer zone regulation are the following: (1) to maintain vegetated buffers around intermittent and perennial streams to minimize the contribution of sediment to the streams outside of the permit area, and (2) to minimize gross disturbances to the prevailing hydrologic balance, fish and other biologically important plants and animals that may live in the streams or riparian zones adjacent to the streams. However, the regulation also recognizes that unavoidable incursions into the buffer zone may be necessary and the regulations establish standards for allowing these incursions.

Historically, OSM has not viewed, applied, or enforced the buffer zone regulation to prohibit mining activities within the buffer zone if those activities would have less than a significant effect on the overall chemistry and biology of streams, i.e., the overall watershed or stream below the activity. Therefore, excess spoil fill construction within the buffer zone has been allowed if a demonstration of no significant effect on downstream water quality was made by the permit applicant to the satisfaction of the SMCRA regulatory authority. This interpretation resulted because to interpret the SBZ rule as an absolute prohibition for constructing valley fills in streams would counter other statutory provisions. SMCRA recognized the necessity of excess spoil fills in SMCRA Section 515(b)(22), and the only available location for excess spoil placement in steep slope mining is in valleys adjacent to the mining area. These valleys may contain headwater streams.

Further, in the Final EIS 1: Supplement (1983) in the analysis of the impacts of the current SBZ rule, OSM recognized that some small headwater streams in Appalachia would be disturbed by mining and not restored. This supplement assumed that intermittent streams draining less than 640 acres would not be protected by the SBZ rule, even though those streams could harbor a viable biological community or serve as fish spawning area. [USDOI OSM, January 1983, p. IV-37.]

OSM is currently preparing a draft proposed rule that would amend the rules at 30 CFR 816.57 and 817.57 to clarify the SBZ requirements. These amended rules would more closely align with the principal statutory basis for the rule [30 U.S.C. 1265(b)(10) and (b)(24)]. Exemptions to the SBZ requirements would only be granted upon a demonstration by the coal operator, to the satisfaction of the SMCRA regulatory authority, that encroachment into the SBZ is necessary and that disturbances to the prevailing hydrologic balance at the mine-site and in associated offsite areas have been minimized. The operator would use the BTCA to minimize adverse impacts to fish, wildlife, and other environmental values, and to prevent, to the extent possible, additional contributions of suspended solids to stream flow or runoff outside of the permit area. As a complementary rule

change, the excess spoil regulations would be amended to ensure that the volume of excess spoil is minimized and that excess spoil fills are constructed in a manner and location to cause the least environmental harm after consideration of alternative designs and locations [Chapter II.C.5.b., Action 7].

SMCRA also contains provisions to designate lands unsuitable for mining. If sufficient information is provided in a petition to the SMCRA regulatory authority to demonstrate that reclamation required by SMCRA is not technologically or economically feasible, areas containing particularly sensitive aquatic sites may be deemed off limits for surface coal mining operations. SMCRA also provides for temporary or permanent diversion of streams prior to surface coal mining affecting stream segments [30 CFR 816.46]. Permanent stream diversions require restoration of aquatic and riparian features to offset mining impacts. These provisions of the SMCRA program may directly or indirectly provide restrictions to stream loss from valley fills.

b. Alternative 1

Action 3.1: OSM would continue existing SBZ rule-making and consider additional rule-making specifically exempting excess spoil disposal from the stream buffer zone rule [30 CFR 816.57], but adding a requirement that all other applicable environmental permits, such as a CWA Section 404 permit, be secured prior to the placement of fills in waters of the U.S.

This action would not affect the current OSM rule-making to clarify the SBZ rule as described under the No Action Alternative [Chapter II.C.3.a]. Under this action, OSM would consider further amendments to the SBZ rules to specifically exempt excess spoil disposal from SBZ requirements. In light of this exemption, the SMCRA agency would rely more on the expertise of the CWA Section 404 agency to determine whether excess spoil fills are allowed to be placed in jurisdictional waters; and their location, size, and number. Further, more emphasis would be placed on SMCRA permit conditions requiring the applicant to secure all necessary permits, including all applicable CWA permits, prior to the placement of fills in waters of U.S. Other SMCRA standards for protection of the hydrologic balance, as well as fish, wildlife, and related environmental resources would continue to apply to excess spoil fills. To be consistent with this potential change in the Federal program, analogous provisions from state regulatory programs could also be the subject of rule-making.

c. Alternative 2 and 3

Action 3.2 and 3.3: OSM would continue with current rule-making to amend the stream buffer zone rule and would consider additional rule-making in the future to increase consistency with the CWA Section 404 program, if appropriate, and to the extent authorized by SMCRA.

The No Action Alternative discusses ongoing rule-making to amend and clarify the SBZ rule. This action could also include later OSM consideration of additional amendment to the SBZ rule to increase consistency with the CWA Section 404 program, if appropriate and supported by SMCRA. Rule-making considerations could occur in concert with or following the collaborative efforts described under Alternatives 2 and 3. For instance, OSM could further clarify or expand regulatory requirements related to incursions in the SBZ, if the development of a joint application, MOA, FOP, and JPP identify warranted changes authorized by SMCRA provisions and compatible with objectives in the CWA Section 404 program.

d. Alternative 1 and 2

Actions 4.1 and 4.2: Designate Areas Generally Unsuitable for Disposal Referred to as Advanced Identification of Disposal Areas (ADID).

The ADID [40 CFR 230.80] is an area-wide planning process that provides the public and potential permit applicants with information on the functions and values of streams and other waters, creates greater regulatory predictability by providing an indication of factors to be considered in permit reviews, and assists other local planning efforts. Approximately 65 identification and special area management plans based on such advance identifications have been implemented nationwide. Because ADID efforts are usually based on watershed planning, they are extremely compatible with geographic and ecosystem initiatives such as EPA's Watershed Protection Approach.

The basis for designating areas generally unsuitable for disposal is the likelihood that use of the area in question for dredged or fill material disposal would not comply with the CWA Section 404(b)(1) Guidelines. However, this "advance identification" of areas generally unsuitable for fill is not a veto or advance denial; in fact, the regulations state "[t]he identification of areas that generally would not be available for disposal site specification should not be deemed as prohibiting applications for permits to discharge dredged or fill material in such areas." Applicants are not prohibited from applying for a permit for activities within an ADID, and the COE is not prevented from issuing a permit where the CWA Section 404(b)(1) Guidelines can be met and no practicable alternative exists.

The ADID process was developed to identify particularly sensitive or high value aquatic resources. The ADID regulations have historically been used only for specific geographic locations and not applied to a general class of particular stream segments or water resources. The ADID designation only occurs following exhaustive site-specific data collection and analysis, thorough public participation, and, often, contentious legal challenges. The ADID designation highlights areas where projects would receive more stringent scrutiny before any authorizations might be possible. Although not traditionally used in this fashion, the COE and EPA agree that the ADID process is available to designate particularly significant stream segments based on special aquatic conditions. Alternatives 1 and 2 provide this as an advisory action. Selection of Alternative 3 would not include ADIDs. EPA and the COE would explore use of this ADID approach.

4. Stream Impairment

Activities in headwater streams have the potential to influence downstream aquatic functions and resources. Information on mountaintop mining indirect stream impacts is discussed in Chapter III.D. The relationship of mining to groundwater quality and quantity as it relates to stream base flow is presented in Chapter III.H. Coal mine drainage effects on stream water quality are discussed in Chapter III.E. Technical studies were conducted on the scope of stream impairment from mountaintop mining and valley fills [see Appendix D studies on stream chemistry, macroinvertebrates, fisheries, temperature, flow, headwater streams, etc.].

Eight potential impact factors are identified and discussed in Chapter III.D.1. The factors attributable to stream impairment discussed in Section II.C.3 above are the following: loss of linear stream length; loss of biota under fill footprint or from mined stream areas; and loss of upstream energy from buried stream reaches. These direct impacts may result in stream impairment

downstream. The factors discussed here are the following: changes in downstream thermal regime; changes in downstream flow regime; changes in downstream chemistry; changes in downstream sedimentation; and effects to downstream biota.

Studies indicate that aquatic communities downstream of surface coal mining operations and valley fills may be impaired. Data show an increase in water temperature in winter and a decrease in summer below valley fills. Streams below valley fills may shift from ephemeral or intermittent to perennial flow. Temperature and flow changes are the result of mining backfill and valley fill interaction with groundwater contributions to stream base flow.

Certain chemical parameters (such as sulfates, specific conductance, selenium) are sometimes elevated downstream of mining or valley fills. Stream reaches below mining and valley fills may have changes in substrate particle size distribution from increased fine material due to sedimentation. Excessive sedimentation does not appear to occur in first and second order streams; however, the studies were inconclusive in higher order stream reaches.

Some macroinvertebrate communities change in terms of diversity, population size, pollution tolerance. Total fish species downstream of some filled sites were lower than mined and reference sites. However, fisheries sampling was limited by drought conditions during the study period and the sample population may not be statistically representative.

The sample size and monitoring periods conducted for the EIS were not considered sufficient to establish firm cause-and-effect relationships between individual pollutants and the decline in particular macroinvertebrate populations. Impairment could not be correlated with the number of fills, their size, age, or construction method.

a. The No Action Alternative: The Regulatory Program Today

CWA regulatory measures are designed to minimize or prevent stream impairment and to restore streams where impairment exists. This section describes how antidegradation policy, water quality standards, effluent standards, and monitoring provisions combine to address stream integrity. The SMCRA and CWA Section 404 program rely on these measures to regulate surface coal mining operations.

a.1. CWA Antidegradation policy

CWA regulations establish an "antidegradation policy" at 40 CFR 131.12. Basically, this policy says that states and/or EPA must adopt an antidegradation policy and a plan for implementation that, at a minimum, maintains and protects existing in-stream water uses and the quality of water necessary for those uses. The antidegradation policy must provide for review before allowing degradation of "high quality" waters of the U.S. High quality waters can only be degraded if the review finds that lower water quality is warranted to accommodate important economic or social development in the area. No degradation of "outstanding national resource" waters is permissible. The WQS Fact Sheet [Appendix B] outlines the basic anti-degradation requirements in state water quality standards.

As it applies to CWA Section 404 permits, EPA has recognized the Congressional intent to allow fills and has interpreted that the antidegradation policy is satisfied with regard to fills if the discharge

did not result in "significant degradation" to the aquatic ecosystem as defined under 40 CFR 230.10(c) of the CWA Section 404 (b)(1) Guidelines [USEPA 1994]. This provision provides a mechanism to address potential impairment of streams from valley fills.

a.2. CWA Water Quality Standards

Water quality standards are the foundation of water quality-based control program mandated by the CWA. The four basic elements in establishing water quality standards are designated uses, water quality criteria, antidegradation policy, and general policies for implementation. The states specify, based upon scientific criteria, the appropriate water uses to be achieved and protected. Appropriate uses are identified by taking into consideration the use and value of the waterbody for public water supply, for protection of fish, shellfish, and wildlife, and recreational (including fishing and swimming), agricultural, industrial, and navigational purposes. Water quality criteria include aquatic life, human health, biological, nutrient, microbial, and wetlands. Antidegradation implementation procedures identify the steps and questions that must be addressed when regulated activities are proposed that may affect water quality.

Water quality standards are adopted by states under Section 303 of the CWA, subject to EPA approval. The water quality standards assist in maintaining the physical, chemical, and biological integrity of a water body by designating its uses, setting criteria to protect those uses, and establishing provisions to protect water quality from degradation. Standards help to identify water quality problems caused by improperly treated wastewater discharges, runoff or discharges from active or abandoned mining sites, sediment, fertilizers, and chemicals from agricultural areas, erosion of stream banks caused by improper grazing practices, etc. Several CWA features act as mechanisms to implement water quality standards so as to achieve and maintain protective water quality conditions. These features include the following:

- Total maximum daily loads (TMDLs) [40 CFR 130.7], waste load allocations (WLAs, CFR) for point sources of pollution, and load allocations (LAs, CFR) for non point sources of pollution require establishment of existing stream conditions and plans for restoring and or protecting stream uses.

- Water quality management plans [CWA Section 303] prescribe the regulatory, construction, and management activities necessary to meet the water body goals [40 CFR 130.6].

- NPDES [CWA Section 402] results in water quality-based effluent limitations for point source discharges which considers actual water quality conditions and uses of the water body. [40 CFR 122.44(d)].

- CWA Section 401 water quality certifications provide for state evaluation and concurrence for Federal actions affecting water quality [40 CFR 131].

- CWA Section 305(b) requires documenting current water quality conditions in periodic reports.

- CWA Section 319 requires management plans for the control of non-point sources of pollution.

The CWA requires states and authorized Indian Tribes to review their standards from time to time, but at least once every three years, and revise them if appropriate. Updates may be needed, for example, due to changing water quality conditions or water body uses or new scientific information on the effects of pollutants in the environment. In preparing proposed revisions to their standards, states and Tribes consider requests from industry, environmental groups, and the public, and review available information (e.g., CWA Section 305(b) reports, EPA guidance).

States and Tribes have the authority to adopt water quality criteria with sufficient coverage of parameters and of adequate stringency to protect designated uses. In adopting criteria, states and authorized Tribes may undertake the following:

- adopt the criteria that EPA publishes under Section 304(a) of the Clean Water Act;
- modify the Section 304(a) criteria to reflect site-specific conditions; or
- adopt criteria based on other scientifically-defensible methods.

States and authorized Tribes or EPA typically adopt both numeric and narrative criteria, subsequently approved or revised based on EPA review. Numeric criteria are important where the cause of toxicity is known or for protection against pollutants with potential human health effects. Narrative criteria are also important; narrative "free from" toxicity criteria typically serve as the basis for limiting the toxicity of waste discharges to aquatic species (based on whole effluent toxicity testing).

Section 303(c)(2)(B) of the CWA requires states and authorized Tribes to adopt numeric criteria for Section 307(a) priority toxic pollutants for which the EPA has published Section 304(a) criteria, if the discharge or presence of the pollutant can reasonably be expected to interfere with designated uses. The Section 307(a) list contains 65 compounds and families of compounds, which EPA has interpreted to include 126 priority toxic pollutants.

EPA approval of a new or revised water quality standard is considered a Federal action which may be subject to the ESA Section 7 consultation requirements. Section 7 of the ESA requires Federal agencies to utilize their authorities in furtherance of the ESA by carrying out programs for the conservation of threatened and endangered species. It also states that Federal agencies shall, in consultation with the FWS, insure any actions authorized, funded, or carried out by such agency "is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical..." Accordingly, consultation with the FWS on standards that may affect listed species is an important part of EPA's water quality standards approval process.

Proposed surface coal mining operations must demonstrate the ability to comply with these water quality standards prior to authorization of valley fills or outfalls in waters of the U.S. Compliance with these program features provide protection from impairment of waters, or fosters restoration of waters.

Total Maximum Daily Loads (TMDLs)

CWA Section 303(d) requires states or EPA to identify impaired waters and establish a priority ranking for them, taking into account the severity of pollution and uses to be made of such waters. Section 303(d) also requires states or EPA to establish TMDLs for these impaired waters. These

impaired waters do not meet water quality standards even after point sources of pollution have installed the minimum required levels of pollution control technology. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. TMDLs are calculated by summing the allowable loads of a pollutant in a waterbody from all contributing point and non-point sources and must include a margin of safety. The calculation must also account for seasonal variations. A TMDL plan is designed to reduce point source loadings through application of effluent limits in NPDES permits. Non-point source loadings are generally reduced through application of best management practices.

Some TMDLs are established and others are being developed. Where TMDLs are established, no additional loadings may occur for the TMDL pollutant unless the net loading of that pollutant is reduced in the affected reach. TMDL pollutants currently identified for some streams in the EIS study area include pH, iron, and manganese. These pollutants are also the subject of technology-based effluent limitations for coal mining. Other pollutants could be identified for inclusions in a TMDL if those pollutants are identified on the CWA Section 303(d) list as the cause of stream impairment. TMDLs are not self-implementing. The components of TMDL plans are implemented through existing Federal, state or local programs with enforcement capabilities (e.g., NPDES for point source pollutants; or through voluntary BMP-based programs for non-point source pollutants). For example, if a new coal mining project is proposed within a watershed subject to TMDLs, the NPDES permit for the project cannot be approved until a net reduction of the designated pollutant(s) occurs within the watershed. [40 CFR 130.7]

a.3. CWA Section 402 NPDES Permits and Water Quality Protection

Discharges of pollutants through point sources to waters of the U.S. require permits issued under the NPDES program, authorized by the CWA. Technology based effluent limits for the NPDES program are established by EPA to restrict the concentration of particular pollutants associated with a particular industry (e.g., iron for coal mining discharges). While it retains oversight authority, EPA has approved the permitting and compliance authorities of the NPDES program to Kentucky, Tennessee, Virginia, and West Virginia as well as all of the other coal mining states in the eastern U.S. For the coal mining industry, NPDES permits are required for the following: all chemical treatment outfalls; sedimentation control structure outfalls, including in-stream ponds associated with valley fills; and non-point source sheet flow from disturbed or reclaimed areas.

NPDES permits include effluent limits and requirements for self-monitoring and submitting the results to the NPDES authorities on discharge monitoring reports (DMRs). NPDES permits are issued for five-year periods and applications for re-issuance are required 180 days prior to permit expiration. In its oversight authority, EPA may review, comment on, and, where not in compliance with NPDES regulations or CWA, object to draft NPDES permits for coal mining. Although the states regularly review DMRs, EPA does not normally review DMRs for mining facilities, unless it considers them to be major permits. However, EPA periodically visits NPDES program offices in its coal states and reviews permitting and compliance actions, including DMRs.

NPDES permits for municipalities and most industries are normally handled by the respective state water protection agency. However, to maximize agency resources, some state SMCRA agencies have elected to conduct coordinated SMCRA/NPDES application reviews. This provides improved efficiency and environmental assessment, since applications for surface coal mining operations

undergo comprehensive SMCRA reviews, including aspects to protect aquatic resources. The approaches for NPDES/SMCRA processing by states within the EIS study area are the following:

- Kentucky - The KYDNREP, Division of Water provides NPDES reviews and permitting separately from SMCRA permitting, which is provided by the KYDNREP DSMRE.

- Tennessee - The Tennessee Department of Environment and Conservation, Division of Water Pollution Control is the authorized NPDES reviewing agency. This agency coordinates NPDES issuance with the OSM SMCRA review and approval.

- Virginia - The DMME, DMLR is the authority for both the SMCRA and NPDES programs.

- West Virginia - The WVDEP, Office of Mining and Reclamation, provides joint reviews of SMCRA and NPDES permit applications, issues SMCRA permits, and drafts NPDES permits. The WVDEP, Office of Water Resources, is the NPDES authority and issues the NPDES permits in coordination with the Office of Mining and Reclamation.

Activities authorized under SMCRA and CWA Section 404 proposals for surface coal mining operations with valley fills must comply with any applicable NPDES effluent limits. The effluent limits for point sources associated with coal mining consider industry-wide treatment technology and address specific concentrations for iron, manganese, pH, and suspended solids as well as measures to protect aquatic life and human health. The DMR provides for industry and state regulatory agency monitoring data to indicate compliance and tools to protect stream quality. This feature of the CWA program guards against impairment levels affecting designated uses.

a.4. CWA Section 401 Certification

CWA Section 401 provides that states certify that Federal activities or activities requiring Federal approvals relative to CWA Section 404 would not violate applicable effluent limitations, or other limitations, or other water quality requirements. A CWA Section 404 permit for MTM/VF proposals cannot be issued unless a CWA Section 401 certification is issued or waived for a particular proposal. The state may consider antidegradation, technology-based effluent limitations, and water quality requirements in determining whether to certify the proposal under CWA Section 401. The state can add conditions to its certification. The COE recognizes and the applicant is required to abide by the conditions to the certifications. Some states issue a general CWA Section 401 certification with conditions for NWP21. Individual certifications or waivers are required for all IPs and any NWP not covered by a state's general CWA Section 401 certification. The COE presumes that a state water quality certification satisfies the requirements of CWA Section 401; the CWA Section 404(b)(1) Guidelines relevant to water quality under 40 CFR 230.10(b)(1); and the COE rules at 33 CFR 320.4(d). A state can deny CWA Section 401 certification if it finds that a proposed activity will not meet applicable limits, fails to protect designated uses, or will not appropriately guard against stream impairment.

a.5. Stream Bio-monitoring

The objective of bio-monitoring is to provide a functional assessment of the ecological characteristics of aquatic sites. These assessments are to consider the ecological functions included in the CWA Section 404(b)(1) Guidelines. Bio-monitoring normally includes macroinvertebrate surveys using the EPA Rapid Bio-assessment Protocols. These include establishing a number of sampling stations, providing habitat evaluations, descriptions, scores, and providing macroinvertebrate metric values and scores for the Family Biotic Index at the sampling stations. Accordingly, EPA recommends that bio-monitoring be provided on streams to be impacted by proposed valley fills. This monitoring aids in permitting decisions (e.g., minimal impact and mitigation decisions), including CWA Section 404 permits. EPA published guidance for chemical/biological protocols in January 2000 as an interim monitoring approach. The protocols can be found on EPA's mountaintop mining web page (http://www.epa.gov/region3/mtntop/documents/html).

In December 2002, the COE issued a Regulatory Guidance Letter (RGL) Number 02-2 recommending a functional assessment by qualified professionals or the best professional judgement of Federal, tribal, and state agency representatives to determine impacts and compensatory mitigation requirements. This functional assessment protocol should include benthic, chemical, and physical characterization of the aquatic ecosystem, such as a Hydrogeomorphic Assessment or Wetlands Rapid Assessment Procedure. COE Districts (i.e., Huntington, Norfolk, and Nashville Districts) are in the process of implementing consistent protocols based on EPA Rapid Bio-Assessment procedures and a functional scoring system developed by the Louisville District and currently in use by the Louisville, Nashville and Huntington Districts in Kentucky. These functional assessments would be an integral part of COE determinations to decide whether MTM/VF proposals must undergo IP processing or be eligible for authorization under the NWP 21 permit. Further, data from the application of these protocols would be used by the COE to establish science-based impact thresholds, if feasible [Chapters II.C.6 and II.C.7; Actions 9 and 12]. Please see Chapter II.C.6 for additional discussion of functional stream assessments and mitigation.

While all CWA Section 404 permits require use of bio-monitoring, additional approaches for bio-monitoring by the state SMCRA or water quality agencies are as follows:

- Kentucky - Stream bio-monitoring is conducted as a part of the permitting process on a case-by-case basis for operations where aquatic life impacts are a concern.

- Tennessee - Stream bio-monitoring is not conducted as a part of the permitting process, but may be provided on a case-by-case basis for operations where aquatic life impacts are a concern.

- Virginia - Similar to Kentucky, bio-monitoring may be conducted on a case-by-case basis on streams below discharges where aquatic life impacts are a concern.

- West Virginia - Baseline benthic surveys are required within the footprint and below the fill on intermittent and perennial sections of streams proposed to be permanently filled by the applicant. Those fills having more than 250-acre drainage areas are required to have semi-annual benthic and annual fisheries monitoring throughout the life of the permit per the interim protocols. This is primarily to provide an assessment of aquatic impacts due to permanent valley fills and temporary fills such as in-stream sedimentation ponds or deep mine face-ups. It also is used to help

determine downstream impacts for the State CWA Section 401 certification. Also, toxicity tests are run on pond effluents on a case by case basis, particularly where manganese discharges and potential over treatment with alkaline reagents are a concern.

The bio-monitoring of baseline stream conditions assists the regulatory authorities in determining stream uses, appropriate protective measures, and compensatory mitigation measures necessary to guard against stream impairment or other loss of aquatic resources.

a.6. Stream Monitoring of Metals and pH

Stream monitoring requirements for pH and metals (normally iron, manganese, and aluminum) occur under both the CWA [40 CFR 434.35] and SMCRA [30 CFR 816.41] during the application, operational, and reclamation stages. Monitoring stations are normally upstream, downstream, and in the vicinity of the outfalls. Sampling frequency is normally the same as the NPDES outfall sampling frequency, twice monthly until the area contributing to the discharge is backfilled and regraded. This would be applicable to outfalls downstream of valley fills. Results are screened for possible water quality standard violations, and also used to indicate water quality trends resulting from the mining operation and discharges. Monitoring and screening are used to achieve performance standards and, thus, are mechanisms that serve to minimize stream impairment.

b. Alternatives 1, 2, and 3

The actions listed below could deal directly with stream impairment by: 1) developing additional water quality standards based on additional study and data collection regarding impacts; and, 2) using monitoring protocols for aquatic ecosystem functional assessment. Other actions developed for issues such as III.C.3. Direct Stream Loss; III.C.5. Fill Minimization; III.C.6. Stream Habitat and Aquatic Functions; III.C.7. Cumulative Impacts; and III.C.8. Deforestation could mitigate stream impairment as well.

Action 5: The agencies would continue to evaluate the effects of mountaintop mining operations on stream chemistry and biology. As appropriate, EPA would develop and propose criteria for additional chemicals or other parameters (e.g., biological indicators) that would support a modification of existing state water quality standards.

Monitoring data collected during permitting and surface coal mining activities would be compiled and analyzed by the agencies to determine whether statistically valid and reliable relationships can be established between mining/fills and stream impairment. In addition, these data would be used to develop appropriate controls to avoid or mitigate such impacts. As appropriate, EPA would utilize these data to develop and propose criteria for additional chemicals (e.g., sulfates) or other parameters (e.g., biological indicators) that would support a modification of technology-based effluent limits and/or existing state water quality standards. Modifications could result in changes to monitoring requirements and mitigation.

Action 6: Federal agencies would continue to work with states to further refine the uniform, science-based protocols for assessing ecological function, making permit decisions, and establishing mitigation requirements.

Used in combination with water quality monitoring, bio-monitoring procedures can be effective in pinpointing certain parameters to focus upon when accomplishing the following:

- designing water quality control features of a project;
- establishing mitigation measures to replace or restore aquatic function;
- evaluating the effects associated with different fill sizes, construction techniques, or locations as part of the alternative fill siting analysis; and
- assessing the advisability of individual and/or cumulative impact thresholds;
- identifying stream reaches supporting naturally diverse and high quality aquatic populations for possible advanced identifications (ADIDs).

An example of bio-monitoring to assess baseline stream health using macroinvertebrate data is the West Virginia Stream Condition Index (WVSCI), which was used in some of the aquatic studies conducted for this EIS. The COE stream functional assessment protocol developed by the COE Louisville District for use in the Appalachian region takes into account biological, chemical, and physical conditions of the stream reach. The COE protocol establishes a reproducible "score" with which to evaluate the level of stream functions using similar, least disturbed reference sites for comparison. In addition, the protocol establishes the comparable mitigation level to offset unavoidable impacts to stream segments [see description of protocol under III.C.6. Issue E, Stream Habitat and Aquatic Function]. States and other Federal agencies have different terminology and yardsticks for determining ecological functions and values; and different methods are being used for assessing impacts.

This action builds upon existing science-based methods such as the WVSCI and COE functional assessment protocol. The action's goal is to bring stakeholders as well as state and Federal agencies together to establish a workable set of criteria and science-based methods for determining baselines, impacts, and mitigation requirements. Further, this monitoring information could be used to identify and evaluate listed species habitats, stream reaches supporting naturally diverse and high quality aquatic populations; sole or principal drinking water source aquifers, or other specially-protected areas.

5. Fill Minimization

The size, number, and location of valley fills correlate with direct loss of streams and riparian and terrestrial habitats. SMCRA and the CWA provide mechanisms to address impacts to these resources.

The CWA 404(b)(1) Guidelines require that no fill be permitted if there is a practicable upland alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. The Guidelines further require that, if impacts to streams are unavoidable, fills be minimized to the maximum extent practicable.

Section 515(b)(3) of SMCRA requires all surface coal mining and reclamation operations backfill, compact, and grade overburden and other spoil material to restore the approximate original contour (AOC). A fundamental principle of SMCRA is that surface mines will be reclaimed to AOC so "that the surface configuration generally resembles the land prior to mining and blends into and complements the drainage pattern of surrounding terrain, with all highwalls, spoil piles, and coal

refuse piles eliminated;..." [30 U.S.C.1265(b)(3)]. The AOC requirement compels mining companies to return spoil material to the mined-out area, thus limiting the amount of excess spoil placed in valley fills. However, 30 U.S.C. 1265(b)(3) also provides an exception to AOC in situations where the volume of overburden is large relative to the thickness of coal. In those situations, the operator is required to demonstrate that due to volumetric expansion the amount of overburden and other spoil and waste material is more than sufficient to restore the approximate original contour.

Section 30 U.S.C. 1265(b)(22) specifies the manner in which excess spoil material must be handled and placed. A global requirement of 30 U.S.C. 1265(b)(22) is that fills be designed and constructed in a manner so that all other SMCRA provisions are met. This would include 30 U.S.C. 1265(b)(10), which basically requires minimizing the disturbance to the prevailing hydrologic balance at the mine-site and in associated off site areas, and 30 U.S.C. 1265(b)(24), which requires the use of best technology currently available to minimize disturbances and adverse impacts on fish, wildlife, and related environmental values. These SMCRA provisions provide a statutory basis to minimize the volume of, if not to avoid, excess spoil generation. They also provide the basis for ensuring fills are constructed or placed in a manner which minimizes environmental disturbance.

While OSM regulations exist to implement these SMCRA provisions, current SMCRA regulations do not specify a fill minimization process and do not specifically require valley fills to be located based on the most environmentally protective practical alternative similar to CWA Section 404(b)(1) Guidelines. Discussion of selecting fill locations are in Chapter III.I: Overview of Appalachian Region Coal Mining Methods; Chapter III.J: MTM/VF Characteristics; Chapter III.K: Excess Spoil Disposal; Chapter III.L: Mine Feasibility Evaluation and Planning; and Appendix H: Mining and Reclamation Technology Symposium Proceedings.

a. No Action Alternative: The Regulatory Program Today

a.1. CWA Section 404 Program

When filling waters of the U.S. is unavoidable to conduct a project, the CWA Section 404(b)(1) Guidelines require selection of the practicable alternative (defined below) that is least damaging to the aquatic environment. These Guidelines also require that the amount of filling be minimized and offset by mitigation that restores the lost aquatic functions [40 CFR 230.10(d)]. Compliance with the Guidelines is required before a COE permit can be issued. An applicant must demonstrate to the COE that the size, number and location of valley fills proposed resulted from consideration of practicable alternatives to avoid and minimize aquatic impacts in light of the overall project purpose. Filling, after considering mitigation, cannot result in more than a significant adverse impact (individually or cumulatively from all projects) to the downstream water quality. [40 CFR 230 and 33 CFR 320.]

An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics, in light of overall project purpose. Considerations of cost, however, do not necessarily mean that the least-cost alternative would be selected over the most environmentally preferable alternative. The environmentally preferred alternative is based on an assessment of the aquatic resources within each potential fill site and areas of indirect impacts. An area not presently owned by the applicant which could reasonably be

obtained, utilized, expanded or managed in order to fulfill the basic project purpose may be considered practicable [40 CFR 230.10(a)(2)].

A detailed assessment of costs by the applicant may be required as part of a COE permit evaluation. For example, this assessment could include considerations such as haulage costs to alternative upland sites, alternative mining methods, and property acquisition. Technological considerations could include a demonstration by the applicant that mining methods other than valley fills, such as underground mining, were considered in extracting the coal reserves. For instance, the ability to conduct underground mining is dictated by coal seam thickness and depth of cover. Seams less than twenty eight inches cannot be mined by underground technology but could be mined by surface mine methods if overburden to coal ratios are cost effective. Examples of the logistics of evaluating alternative disposal site design includes upland excess spoil disposal sites, such as abandoned mining benches, placement on previous mining backfills, and for reclamation of coal mine waste embankments.

The considerations of cost, technology, and logistics are included in the determination of whether or not some or all of the upland alternatives are practicable, thus demonstrating that the avoidance of fills in waters of the U.S. has been achieved to the maximum extent practicable. If additional disposal sites within waters of the U.S. are required to accomplish the project purpose, the applicant must then demonstrate that fills in waters have been minimized. Once fills have been reduced to minimize stream loss, the location of valley fills is based on the COE stream assessment protocol. Characterization of streams based on the protocol prioritizes potential fill locations for mining project design, with a preference for protecting high quality streams. For example, the COE may determine that one large valley fill in either high or low quality streams is environmentally preferable to several small valley fills scattered throughout a watershed of high quality headwater streams.

Compensatory mitigation for unavoidable impacts is required by the CWA for both general and individual permits [see Chapters II.C.5: Stream Habitat and Aquatic Functions and III.D.2: Mitigation for MTM/VF Impacts]. The amount and type of compensatory mitigation required are determined by the stream functional assessment of the waters impacted by a specific project; i.e., higher quality streams require more mitigation than lower quality streams. The functions of streams lost through filling can require substantial mitigation as compensation. Consequently, mitigation to replace and restore aquatic functions lost beneath valley fills can be a costly endeavor. Therefore, the cost of compensatory mitigation can serve as an incentive to minimize valley fills in aquatic habitats.

Valley fills in waters of the U.S. must be authorized by COE general permits (including nationwide permits) or individual permits [see description in Chapter II.C.3: Direct Stream Loss]. Since December 1998, based on the *Bragg* settlement agreement, as a general matter, fills in watersheds less than 250 acres are authorized by NWP 21 in West Virginia. Between March 1999 and February 2002 in West Virginia, there have been 5 individual permit applications compared to the 81 projects approved using NWP 21 (http://www.osmre.gov/mtindex.htm). This general principle is currently proposed to apply in specific geographic areas through COE implementation of a regional general condition to the NWP 21 [Chapter II.C.1.a.1]. This regional condition would generally establish an interim threshold of 250 acres. Fills in watersheds greater than 250 acres would generally be processed as an IP, unless subsequently rebutted in the review process by data and analysis. Mining companies have generally designed their valley fills in the EIS study area using the 250-acre

watershed size criterion. Absent this regional condition, mining companies have been concerned that larger fills might trigger an IP requirement.

In January 2002, the COE reissued all of the nationwide permits, including NWP21 [67 FR 2020-2095], which authorizes fill activities associated with surface coal mining activities [see I.C.3.a and II.B.1]. The new NWP 21 requires the COE to complete a case-by-case evaluation of surface coal mining permit applications. This evaluation, which considers compensatory mitigation, determines whether project impacts result in minimal impact to waters of the U.S. If aquatic impacts are determined to be no more than minimal, a project may be approved under NWP 21. Projects that exceed minimal impacts are processed as individual permits. While the general principle of 250 acres still applies in West Virginia, projects would be evaluated on a case-by-case basis in all of the Appalachian states to determine which CWA Section 404 permit review process is appropriate. If regional conditions are added to NWP 21 in specific geographic areas, the conditions would supplement the case-by-case evaluation.

a.2. SMCRA Program

As discussed earlier [Chapter II.C.5], SMCRA provides a statutory basis to minimize the volume of excess spoil, and to design, construct, and locate valley fills so that areal disturbance of fills and the environmental effects of fills are minimized. While the current regulations provide general requirements for carrying out the statutory mandate, the regulations do not specifically extend this mandate to excess spoil. OSM recognizes the importance of this specificity and is initiating the rulemaking process to clarify the obligations of operators to demonstrate that the volume of excess spoil would be minimized, and that the excess spoil fills would be configured and located as to cause the least adverse impacts, both individually and cumulatively.

The proposed rule would likely require the permit applicant to provide volumetric calculations for total spoil, backfill, and excess spoil (including the size and storage capacity of each fill), based on the particular bulking characteristics of each distinct stratigraphic layer comprising the overburden and interburden at the proposed mine site. The new rule could also require that the excess spoil fill areal extent and unavoidable adverse environmental disturbances be minimized to the maximum extent practicable, taking into consideration the configuration, drainage, and stability requirements of 30 CFR 816.102(a) and the fish and wildlife protection requirements of 30 CFR 780.16(c). Finally, the rule could obligate the permit applicant to provide an analysis of all alternative locations for excess spoil fills in the permit and adjacent permitted areas to demonstrate the selection of the least environmentally damaging alternative.

The AOC requirement compels mining companies to reclaim by returning spoil material to the mined-out area, minimizing the amount of excess spoil requiring valley fills [30 U.S.C. 1265 (b)(3)]. Current SMCRA regulations place no quantifiable limits on the application of the AOC concept. That is, final backfill elevations do not have to be within a specified vertical distance from pre-mining elevation. Similarly, there is no requirement that a certain percentage of the volume of material removed during mining must be returned to the mined out area. In the preamble to the AOC rule [48 FR 23356], OSM concluded that development of numerical limits was best left to individual regulatory authorities due to varying topographic and mining conditions around the country.

In 1999, OSM developed guidance for states to consider in assessing AOC compliance, based on several terms within the SMCRA definition of AOC. The terms included in the guidance are the following: backfilling and grading; closely resembles; configuration; drainage patterns; mined area; and terracing or access roads. These terms can be considered variables for analysis purposes and logically grouped into the following three focus areas: configuration (including access); stability; and drainage. In addition to achieving AOC, surface coal mining reclamation must meet performance standards for these focus areas. In other words, mined land must attain a configuration that closely resembles the land prior to mining and be accessible and stable with adequate drainage control. OSM guidance served as the basis for policies currently used in the SMCRA programs in Kentucky, Tennessee, Virginia, and West Virginia [see Appendix J].

In 2000,West Virginia (with assistance from OSM and as a term of a consent decree in *Bragg*) developed and implemented a policy with a protocol that provides an objective and systematic process for achieving AOC on steep slope surface mining operations. The WVDEP AOC protocol maximizes the amount of spoil returned to the mined area and determines excess spoil quantities requiring disposal sites, i.e., valley fills. The WVDEP AOC models are objective yet flexible processes for determining post-mining surface configurations for contour and other mountaintop mining operations. The resultant post-mining configuration should closely resemble the pre-mining topography and satisfy the access, drainage control, sediment control, and stability performance standards, thus achieving AOC as well. This process minimizes impacts to aquatic and terrestrial habitats. EPA, COE, and OSM recognized the WVDEP AOC guidance as an integral component of CWA fill minimization and alternatives analysis.

No detailed protocol similar to the WVDEP policy has been developed or implemented by the Federal SMCRA program. However, OSM has encouraged other Appalachian steep-slope states to develop AOC policies. Kentucky, Virginia, and Tennessee have written new policies that do not contain specific engineering formulae, but incorporate the basic principles of drainage control, access, configuration, and stability from the OSM guidance.

b. Alternatives 1, 2, and 3

Action 7: OSM would continue the on-going rule-making process to clarify the obligations of an operator to demonstrate that the volume of excess spoil will be minimized, and that the excess spoil fills be configured and located as to cause the least adverse impacts, both individually and cumulatively. OSM could undertake additional future rule-making to increase consistency with the CWA Section 404 program, as appropriate and authorized by SMCRA.

The COE and EPA use the CWA Section 404(b)(1) Guidelines to require the permit applicant to demonstrate that placement of fill materials in waters of the U.S. has been avoided and minimized to the maximum extent practicable. The current rule-making effort by OSM would clarify the SMCRA obligations to minimize excess spoil and the adverse impacts stemming from valley fill construction [Chapter II.C.5.a.2]. This amendment to the SMCRA regulations would not only be in accord with SMCRA provisions, it would also increase consistency with CWA Section 404(b)(1) Guidelines.

OSM would also consider whether additional future rulemaking is warranted. This later rulemaking might increase consistency with the CWA Section 404 program or "fine tune" fill minimization and alternative analysis that grow out of the ongoing rule making [Chapter II.C.3.a.2]. OSM rule-making may be appropriate after experience is gained with Federal and state agencies involved in

the development of elements of coordinated decision making and collaborative CWA/SMCRA permitting program described under Action 1 for all alternatives.

The creation of the MOA, FOP, joint application, etc., may indicate that additional data collection, impact predictions, and analysis could increase SMCRA consistency with CWA standards, e.g., by satisfying CWA Section 404(b)(1) Guidelines analysis. OSM could consider future amendments to the excess spoil rules and/or other permitting/performance requirements in this regard. These types of amendments are most likely under Alternative 2 and 3, since the COE will perform IP processing and CWA Section 404(b)(1) analysis under Alternative 1. Similar review under the SMCRA program could be unnecessarily redundant for Alternative 1.

6. Assessing and Mitigating Stream Habitat and Aquatic Functions

The discussion of the importance of headwater streams is in Chapter III.C: Appalachian Aquatic Systems and Appendix D: Headwater Stream Symposium. Technical studies were conducted on the scope of the direct impacts to streams from mountaintop mining and valley fills in Appendix I: Cumulative Impact Study and Chapter III.K: Fill Inventory. Chapter II.C.3. discusses the issue of direct stream loss and the existing regulatory controls for limiting such loss. Chapter II.C.5 describes the way the regulatory programs seek to minimize fill impacts that cannot be avoided. This section focuses on ways to assess the aquatic habitats and stream health of potential fill sites. The use of stream functional assessments determine the mitigation required for unavoidable adverse impacts from MTM/VF. Mitigation methods and success criteria are also discussed in this section. Information related to aquatic mitigation is also discussed in Chapter III.D.2. Studies on surface coal mining reclamation using wetlands and aquatic ecosystem enhancement are in Appendix D.

Mitigating for lost stream functions is important to ensure that significant degradation to waters of the U.S. does not occur. Reclamation and compensatory mitigation plans are significant considerations in the authorization of fills in waters of the U.S., including headwater streams. For such mitigation plans, there is a preference for onsite (on the same site as the habitat being impacted) and in-kind (same habitat as that being impacted) compensation. However, recreating headwater streams onsite to functionally replace those directly lost from filling operations is difficult and not often undertaken as compensatory mitigation. Experience with the technology required to create streams that match those directly lost through valley fills is very limited. To recreate intermittent or perennial streams onsite, the channel must intercept local groundwater. The potential channel locations and elevations may not coincide with prevailing geologic structure (dip or hydraulic gradient) making local groundwater horizons difficult to capture for establishing stream flow [Appendix D: Aquatic Ecosystem Enhancement Symposium].

While proven methods exist for larger stream channel restoration and creation, the state of the art in creating smaller headwater streams onsite has not reached the level of reproducible success required for these efforts to be reasonably relied upon programmatically as an option for full compensatory mitigation. Consequently, other forms of compensatory mitigation are employed and other sites outside the footprint of the fill are often utilized to offset unavoidable aquatic impacts of valley fill operations. Mitigation sites (on- or offsite) require a conservation easement so that protection of the aquatic resources is assured in perpetuity. Because mining companies often lease mine sites and may not own or control offsite areas, this easement requirement can sometimes pose a significant barrier to the location of suitable mitigation opportunities–either onsite or offsite. These factors can also result in greater consideration of in lieu fee arrangements whereby mitigation

is accomplished through monetary payment for aquatic conservation/restoration projects identified by government resource agencies.

Effective compensatory mitigation plans frequently include a variety of components that address aquatic habitat functions such as improvements to water quality and temperature; organic input; and, macroinvertebrate, fisheries, and riparian habitat. Offsite mitigation watershed improvement efforts may include, under certain circumstances:

- Creating riparian wetlands and re-establishing flood plains;
- Planting riparian vegetation;
- Creating channel improvements (e.g., riffle/pool complexes, dredging, sinuosity, bank stabilization, and measures to minimize downcutting such as weirs);
- Controlling and reducing sedimentation and pollution sources (e.g., reclamation of abandoned mine lands and remediation of other adverse environmental conditions within the watershed);
- Re-establishing adjacent forests;
- Employing water quality improvement techniques (e.g., anoxic limestone drains, drums, flumes, and other passive treatment systems);
- Improving fisheries habitat (e.g., shading, increasing habitat heterogeneity, aeration through riffles or other natural means); and,
- Removing stream encroachments (e.g., roads, crossings, ponds, or other fills).

A comprehensive mitigation strategy may include any number of these approaches, but must result in the replacement of the appropriate type and quantity of aquatic functions lost due to project impacts. The success of any comprehensive mitigation strategy is dependent upon a high degree of inter-governmental cooperation, public participation and coordination of all necessary permits or approvals.

a. No Action Alternative: The Regulatory Program Today

The CWA Section 404 regulatory program requires compensatory mitigation for unavoidable impacts to waters of the U.S. Compensatory mitigation is designed to replace the aquatic functions lost or degraded due to fills in aquatic habitats. To design appropriate compensatory mitigation plans, stream functions must be identified and quantified.

Compensatory mitigation can be in the form of restoration, enhancement, preservation, and creation of aquatic habitats. Mitigation may be part of reclamation of the mine site or restoration of impaired or degraded stream functions off-site. Preference is given to on-site mitigation and then to off-site mitigation that results in the greatest benefit to the affected watershed. The goal of on- or off-site mitigation is to offset adverse project impacts and thereby avoid significant degradation to aquatic resources. The restoration of existing impaired streams [identified by states in accordance with CWA Section 303(d)] to meet designated uses may be considered as opportunities for off-site mitigation. The COE has the authority to require bonds to ensure completion of approved onsite and off-site mitigation [33 CFR 325.4(d)].

SMCRA, in order to protect society and environment from the adverse effects of surface coal mining operations, requires that reclaimed surface coal mining operations restore the land to a condition capable of supporting, at a minimum, the pre-mining uses. Thus, to the extent technologically feasible, the SMCRA hydrologic reclamation plan would provide for restoration of aquatic and

riparian habitat to fulfill SMCRA performance standards to minimize impacts onsite; prevent material damage offsite; and enhance fish, wildlife and related environmental resources where practicable. The SMCRA hydrologic reclamation plan stems from SMCRA performance standards to ensure that the hydrologic balance is not adversely affected. This plan includes elements such as diversion, impoundment, and sediment control designs; water supply replacement; and special material handling to prevent toxic mine drainage. While surface coal mining operations must comply with CWA Section 404 requirements described above, unlike the CWA, SMCRA contains no provision for offsite mitigation. SMCRA requires performance bonds to assure reclamation is accomplished in accordance with the approve coal mining reclamation permit. SMCRA bonds cover only on-site mitigation as a component of reclamation.

a.1. CWA Section 404 Program

Under the COE program, after impacts to the aquatic environment have been avoided and minimized to the extent practicable, compensatory mitigation is required to offset any remaining unavoidable adverse effects of the proposed project.

NWPs

On January 15, 2002, the COE reissued all of its NWPs. Those permits generally identified upper limit thresholds (e.g., 1/4 acre of wetland impact, 300 feet of intermittent or perennial streams) for NWP applicability of each of the identified activity. In considering the need for thresholds for NWP 21 (SMCRA-related NWP), the COE determined that there was currently no scientific basis for a programmatic threshold. Additionally, the COE believes that coal mining is different from activities authorized under other NWPs in that coal mining projects are reviewed for environmental impacts under other Federal authorities (SMCRA, CWA Section 402). For this reason, the determination of whether the project will result in more than minimal adverse effects is best made on a case-by-case basis. [67 FR 2042.] However, the COE made the commitment to re-evaluate the possibility of an upper threshold for NWP 21 after this EIS is completed. The COE intends to use the results of this EIS and all other information that may be available at the time, including information resulting from individual verification of all NWP projects as required under the revised 2002 terms and conditions, to make sure that NWP 21 results in no more than minimal impacts (site-specifically and cumulatively) on the aquatic environment [67 FR 2021]. For authorization of a coal mining project under NWP 21, Districts will determine on a case-by-case basis the requirement for adequate mitigation to ensure the effects to aquatic systems are minimal [67 FR 2081]. With these case-by-case determinations based on the results of the stream assessment protocol, the COE may conclude that the impacts are more than minimal (individually or cumulatively) and that the application must be processed as an IP. The process the COE uses to determine minimal impacts is discussed Chapter II.C.1.a.1.

Compensatory Mitigation

The COE issued RGL 02-2 on December 24, 2002, outlining the appropriate compensatory mitigation requirements for adverse impacts to waters of the U.S. These requirements, which are based on sound ecological and hydro-geomorphological principles, include an analysis of the aquatic resource functions. Indicators of aquatic functions, as used in the COE stream assessment protocol, include the physical, chemical and biological characteristics of biotic and abiotic integrity. Variables measuring the physical and chemical (abiotic) integrity include conductivity, riparian

width, canopy, and embeddedness. Variables measuring the biological (biotic) integrity include taxa richness, EPT richness, mHBI, percent Ephemeroptera, and percent (Chironomidae + Oligochaeta).

Full compensation for impacts to the aquatic environment requires equivalent increases in aquatic functions that would be provided as a result of the compensatory mitigation project. That is, the project must sufficiently offset the decline in functions resulting from the authorized impacts. Evaluating the appropriateness of compensatory mitigation requirements involves a comparison between the aquatic functions lost (type and quantity) due to the authorized impacts and the functions gained (type and quantity) for the proposed mitigation project.

Factors considered in determining the adequacy of a compensatory mitigation proposal include, but are not necessarily limited to, the type of functions being replaced; the level at which they are replaced; the speed at which functional replacement is achieved; and the risk that the compensatory mitigation site would not perform as expected. Compensatory mitigation may be accomplished through a combination of onsite restoration (e.g., removal of sediment control structures and restoration of stream channels to pre-mining conditions) and off-site stream rehabilitation or enhancement. The COE encourages applicants to perform compensatory mitigation projects in conjunction with mining operations; however, this is not always possible and in-lieu fees are one option [RGL 02-2]. A permanent conservation easement is required for mitigation sites and coal mine companies frequently do not own the property they are mining. In-lieu fee agreements are government approved monetary payments by applicants to accomplish aquatic resource mitigation. Such agreements exist in Kentucky, Tennessee and Virginia for approved stream restoration projects.

Prior to the reissuance of NWP 21 in January 2002, the COE considered mitigation adequate with inclusion of an OSM or state-approved SMCRA onsite mitigation plan in the permit application. All states in the EIS study area require onsite hydrologic reclamation under SMCRA (regardless of watershed size). In addition, several of the states in the study area require offsite compensatory mitigation based upon state statutes and regulations and as a condition of their CWA 401 water quality certification.

West Virginia requires compensatory mitigation (e.g., aquatic restoration projects, payment into a Stream Restoration Fund, etc.) for fills in watersheds of 250 acres or more [WV Code Section 22-11-7a]. Except for small isolated wetlands of minimal ecological value, the Virginia Water Protection Permit Program [Section 62.1. -- Waters of the State, Ports and Harbors] requires compensatory mitigation of impacts to waters of the Commonwealth, with no watershed acreage limitation. Virginia also has provisions for compensation in lieu of mitigation in limited circumstances. Kentucky is prohibited by statute [KRS 224.16-070] from requiring compensatory mitigation for stream loss from valley fills in watersheds less than 480 acres, except for streams designated as Outstanding State Resource Waters or Cold Water Aquatic Habitat streams [http://water.nr.state.ky.us/wq/Special_waters/]. For fills in watersheds over 480 acres, compensatory mitigation is required for all stream loss due to filling. Kentucky would allow mitigation onsite, offsite or in the form of an in-lieu fee payment to the Kentucky Stream Restoration Fund.

Under Tennessee's program, the state generally requires compensatory mitigation with no watershed acreage limitation for impacts to waters of the state [T.C.A. Chapter 1200-4-7 Aquatic Resource Alteration]. The only exception is small, isolated wetlands of 1/4 acre or less that do not impact

threatened or endangered species. Currently, Tennessee has no regulatory provisions for compensation in lieu of mitigation. The COE Nashville office has an in-lieu fee agreement with the state of Tennessee for aquatic resource mitigation.

The present NWP 21 requires the COE to make a case-by-case determination, with the consideration of any proposed regional conditions, that each project results in no more than minimal impact (individually and cumulatively) to the aquatic ecosystem, including compensatory mitigation. A proposed project would result in an overall minimal impact if impacts to the aquatic environment have been avoided to the extent practicable and any unavoidable impacts have been adequately compensated through mitigation projects providing appropriate replacement of aquatic functions. The COE would evaluate SMCRA onsite hydrologic reclamation and state-approved offsite mitigation during the case-by-case determination of mitigation adequacy. If the COE finds that SMCRA or state-approved mitigation is inadequate based on stream functional assessments, additional mitigation would be required.

COE Stream Assessment Protocol

During the pre-application stage of mine plan development, the COE requires functional assessments of aquatic resources targeted as potential disposal sites as well as potential mitigation sites. Evaluating these site-specific stream assessments allows the COE to provide technical input to the applicant regarding applicable permitting requirements for different mining scenarios. For example, impacts to high quality streams may require IP processing. Awareness of potential concerns and requirements in the early planning stages of a mining proposal allows the applicant to avoid increased costs associated with securing a permit, selecting appropriate fill sites, and demonstrating adequate mitigation of substantial impacts to the aquatic environment. These pre-application discussions with COE assist in identifying the appropriate locations for functional stream assessments.

Functional assessment data are used in demonstrating avoidance and fill minimization in the design of mining projects and evaluation of mitigation adequacy. If adequate data are not included in the initial application to the COE, a permit decision cannot be reached until the information is complete and technically adequate with respect to functional assessment data and project/mitigation design. The time required to conduct any additional stream evaluations prolongs permit processing. Such evaluations can only be conducted during appropriate field conditions, which may not occur for several months depending on the season. Without adequate stream characterizations, redesign of mining projects or mitigation to satisfy the CWA Section 404(b)(1) Guidelines cannot occur. This information is particularly valuable for projects involving higher quality aquatic resources where applicants to must design project(s) in a manner to avoid, minimize, and provide adequate compensation for impacts to the aquatic environment and mitigation requirements would be more demanding.

In order for the approach outlined above to be effective, the COE must be confident that the measures of aquatic functions used to set the targets for compensatory mitigation are sufficient and reliable. An interagency team of state and Federal agencies, co-chaired by representatives from the COE and the EPA Region IV, was assembled by the COE Louisville District to collect data and develop a stream assessment protocol for headwater streams for eastern Kentucky [http://www.lrl.usace.army.mil/orfpn/info/ekystreamassess/eastkystreamassessment.htm]. The model was based on study data collected by the Kentucky Division of Water while developing a

macroinvertebrate bioassessment index for small headwater streams in the eastern Kentucky coalfield (Pond and MacMurray, 2002). The protocol has been calibrated in eastern Kentucky and is being used by the COE Louisville District to process CWA Section 404 applications involving MTM/VF. The COE Norfolk and Huntington Districts are gathering additional data to calibrate the model so it is representative for their areas. This stream assessment methodology will ultimately be calibrated and used by the COE Districts within the geographic extent of the EIS study area (e.g., the Louisville, Huntington, Norfolk, and Nashville Districts). In specific geographic areas, use of the protocol would be preceded by a NWP 21 regional condition that valley fills in watersheds larger than 250 acres would begin processing as an IP [Chapter II.C.1.a.1.]. Following the initial processing decision based on the 250 acre threshold, the protocol would determine if the impacted aquatic resource is too valuable, or mitigation is insufficient to warrant NWP authorization, then the project must complete processing as an IP.

The stream assessment procedure is largely based on EPA's Rapid Bioassessment Protocols (RBP) for Use in Streams and Wadeable Rivers (Barbour et al., 1999) and depends on reference data calibrated to streams within the region. The RBP is based on sound ecological principles and has undergone extensive peer review and wide field application. The functional stream assessment protocol is a cost-effective tool for baseline data collection by the applicant. In addition, the protocol accommodates review period limitations of the COE District staff when independently verifying functional assessment scores of stream or mitigation sites.

The COE stream protocol includes characterization, assessment, and analysis phases:

> Characterization phase: Similar to the RBP, this phase involves a checklist for describing the headwater stream ecosystem, the surrounding landscape, and the existence of special resources such as endangered species or cultural resources.
>
> Assessment phase: Regionally-calibrated models are developed and used to calculate an ecological integrity index for a defined stream ecosystem. The index represents an estimate of ecological integrity of the stream ecosystem relative to reference (i.e., least disturbed) stream conditions in the same region. The output of the model ranges from 0–1 in decimal increments, calibrated such that a score of 1.0 represents the best stream conditions (i.e., indicative of the reference streams). The model is further calibrated so that a score approaching 0 represents degradation, which indicates maximum deviation from reference conditions. The computed ecological integrity index is multiplied by the length of stream involved (i.e., length of stream impacted due to a proposed discharge of fill or length of stream rehabilitated during compensatory mitigation) to derive a measure of *ecological integrity units* (EIU).
>
> The computed EIUs serve as an estimate of the functions represented by a specific aquatic resource at the time of survey. Assessments of ecological integrity are performed for existing (i.e., pre-project) stream conditions and post-project (following onsite restoration or offsite mitigation) stream conditions. The estimated EIU provides a "currency" to measure the relative quality and quantity of undisturbed stream ecosystem functions; the functional loss expected due to project impacts; and the functional gains anticipated from offsetting mitigation measures.

Analysis phase: Analysis of the characterization and assessment phase results involves the following:

- Description of the potential project impacts;
- Description of the actual completed project impacts;
- Identification of ways to avoid and minimize proposed project impacts;
- Determination of the least damaging alternative to the proposed project;
- Determination of compensatory mitigation needs to offset unavoidable impacts of the proposed project;
- Determination of stream restoration potential within the watershed;
- Development of design criteria for stream restoration projects;
- Planning, monitoring, and managing stream mitigation or restoration projects;
- Monitoring and evaluating performance standards or success criteria for stream mitigation efforts;
- Comparison of stream management alternatives or results;
- Determination of appropriate in-lieu fee ratios; and
- Identification of priorities for in-lieu fee mitigation projects.

Inspection and Bonding

Mining operations must comply with all SMCRA, NPDES, and other state or Federal permit conditions. SMCRA and NPDES permits are designed to provide environmental protection in a manner similar to the objectives of the CWA Section 404 permit terms and conditions. NPDES and SMCRA permits are monitored by routine inspections to assure mining and reclamation occurs in accordance with approved plans. The COE District Engineer (DE) may take into account the existence of controls imposed under other Federal, state or local programs which would achieve the objective of the desired permit terms and conditions, e.g., the number, size and location of valley fills and completion of a mitigation plan [33 CFR 325.4(a)(2)]. The COE may rely on the permitting, data collection, reporting, monitoring, inspecting and enforcement controls established under SMCRA, NPDES and other Federal or state regulatory programs for purposes of CWA Section 404 compliance.

Ensuring compliance with required CWA Section 404 offsite compensatory mitigation (e.g., in-lieu fee payment or aquatic resource projects) through inspection and bonding is the sole responsibility of the COE, unless all or some of the offsite mitigation is also required by state law or regulation. If the DE has reason to consider that the permittee might be prevented from completing work which is necessary to protect the public interest, the DE may require the permittee to post a bond of sufficient amount to indemnify the government against any loss as a result of corrective action it might take [33 CFR 325.4(d)]. The amount of the bond would depend on the amount and type of work to be completed based on past experience.

a.2. SMCRA

Aquatic, Fish, Wildlife, and Related Environmental Resource Characterization

As previously discussed in this Chapter, SMCRA performance standards require minimizing disturbance of the hydrologic balance within the permit area to prevent material damage to the hydrologic balance outside of the permit area. The applicant must adequately characterize the

hydrologic resources through representative baseline data collection of seasonal surface and groundwater quality and quantity. The applicant must also use the baseline data to assist in predicting the probable hydrologic consequences (PHC) of surface coal mining operations on these hydrologic resources. The PHC addresses such factors as how mining operations would avoid stream impacts that would significantly alter runoff and stream flow contributions to different tributaries; adversely affect water quality; temporarily or permanently divert streams; and, manage drainage within and leaving the mine site so that erosion and sedimentation are properly controlled. [30 CFR 780.21.]

SMCRA baseline surface water data collection documents stream flow, temperature, and chemistry. Water quality parameters may include, but are not necessarily limited to, total suspended solids, total dissolved solids or specific conductance, total iron, pH, total manganese, acidity, and alkalinity within and downstream of the proposed mining project. An example of type of baseline information and analysis for PHC preparation is contained in the OSM PHC/CHIA guidance document [Permitting Hydrology: A Technical Reference Document for Determination of Probable Hydrologic Consequences (PHC) and Cumulative Hydrologic Impact Assessments (CHIA); [http://www.osmre.gov/pdf/phcchiareport.pdf]. The SMCRA regulations do not currently contain requirements for biological monitoring or documenting physical attributes of streams. SMCRA requirements, similar to EPA water quality standards, presume that maintaining water quality and minimizing contributions of sediment are surrogates for ensuring biological integrity.

While SMCRA does not specifically require biological monitoring as part of baseline stream characterization, the regulations provide a basis for requesting supplemental information when PHCs suggest that adverse hydrologic impacts may occur as a result of the surface coal mining. In addition, many state SMCRA or water quality agencies currently perform protocols including many of the biological, physical and chemical elements of the COE functional stream assessments. Therefore, between the surface water quality and quantity data required by SMCRA and the biological monitoring required by states, most of CWA Section 404 functional assessment data components are already being gathered for some stream locations.
In addition to these aquatic resource characterizations and hydrologic impact predictions, SMCRA regulations specifically provide details for identification and protection of unusually high value fish, wildlife, and related resources. Minimization of impacts to, and enhancement of, these values are required (to the extent practicable using the best technology currently available), regardless of the level of resource value. Identification of important values and the level of detail for baseline information and the protection plan are established by the regulatory authority, in consultation with the state and Federal fish and wildlife agencies. The fish and wildlife protection plan must be included in the permit application and must contain site-specific considerations. The FWS is afforded the opportunity to review and comment on the protection plans. Many states have included the state fish and wildlife agencies in this review.

During the permitting baseline data collection phase, the regulatory authority, in consultation with the wildlife agencies, has the authority to require definition of the extent of the riparian zone if it is of unusually high value or requires special protection under state or Federal law. Valuable fish and wildlife habitats must be identified and site-specific resource information obtained under 30 CFR 780.16. A protection and enhancement plan for eligible resources is then developed based on the baseline information. A necessary element of stream restoration projects and protection of fish and wildlife values is the replacement of adequate riparian zones. The regulatory authority can require

establishing riparian zones as part of reclamation (whether special resources are involved or not) through the authority of 30 CFR 816.97.

Onsite Mitigation

The AOC performance standard, described in Chapter II.C.5.a.2., is a part of the restoration component of mitigation. This SMCRA provision requires reclamation of the mine site, through backfilling and grading, to conditions closely resembling the pre-mining configuration and blending in with and complementing the surrounding drainage patterns. OSM regulations also require permanent stream diversions designed and constructed so as to restore or approximate the pre-mining characteristics of the original stream channel, including the natural riparian vegetation to promote the recovery and enhancement of the aquatic habitat [30 CFR 816.43(a)(3)]. SMCRA reclamation is not considered complete until water quality leaving the site complies with CWA standards without additional treatment. Sediment control structures may be removed and reclamation performance bonds released when water quality meets standards before entering the sediment pond/structure.

Monitoring and Inspection

Surface water sampling and testing are required during and after mining as part of the approved SMCRA monitoring plan. This monitoring allows comparison of discharges leaving the mine site with baseline quality and quantity as well as receiving stream water quality standards. Such monitoring determines if violations occur and indicates if onsite mitigation is restoring particular water quality functions [30 U.S.C. 1257(b)(9), (11), (13); 30 CFR 816.42].

The approved mining plan includes detailed operational sequencing steps; engineering designs and specifications for roads, drainage control structures, impoundments, backfills, valley fills, etc.; and other hydrologic reclamation plans (such as special material handling, monitoring plans, water replacement contingencies, etc.). The mining plan must be followed by operators when conducting the mining project and is used as a blueprint by SMCRA inspectors to check compliance with both SMCRA and CWA standards.

Bonding for Reclamation

All surface coal mining operations must provide financial mechanisms (e.g., insurance, cash, certificates of deposit, or other types of surety bonding instruments) adequate to cover the SMCRA regulatory authority's anticipated costs of carrying out the approved reclamation plan. The reclamation plan may include onsite mitigation measures. Performance bonds are controlled by the SMCRA authority so that, if the company becomes bankrupt or otherwise insolvent, the reclamation plan can be completed. The amount of the bond required for each mine site "shall depend upon the reclamation requirements of the approved permit; shall reflect the probable difficulty of reclamation giving consideration to such factors as topography, geology of the site, hydrology, and revegetation potential..." as determined by the SMCRA regulatory authority. "The amount of the bond shall be sufficient to assure the completion of the reclamation plan if the work had to be performed by the regulatory authority in the event of forfeiture and in no case shall the bond for the entire area under one permit be less than $10,000." [30 U.S.C. 1259, 30 CFR 800.] Effectively, the SMCRA bond also provides financial assurance that the portion of reclamation constituting onsite mitigation approved by the COE is completed.

b. Alternatives 1, 2, and 3

Action 8: CWA and SMCRA regulatory authorities would continue to assess aquatic ecosystem restoration and mitigation methods for mined lands and promote demonstration sites. The agencies would also work with interested stakeholders to develop a "best management practices" (BMPs) manual for restoration/replacement of aquatic resources.

As discussed previously, the CWA requires avoidance, minimization, or compensatory mitigation for unavoidable impacts to waters of the U.S. Creation of riparian zones, organic carbon re-generation by tree planting, stream reconstruction techniques (such as those identified by Rosgen), constructed wetlands, and other methodologies can be used as mitigation for aquatic resource impacts under the CWA. Mining proposals for CWA Section 404 authorization must design and describe these measures.

The sections above also describe the SMCRA provisions to minimize adverse impacts onsite to the hydrologic balance and to unusually high value fish, wildlife, and related resources. Impact minimization is accomplished through a process of resource characterization, prediction of mining impacts, and development of detailed mining and reclamation plans. SMCRA requires a reclamation plan designed to accomplish performance standards. Onsite mitigation components are part of the reclamation plan.

The technology for re-establishing aquatic functions of impacted streams and related environmental resources is not thoroughly documented in one set of comprehensive guidelines. For example, the Rosgen method [Rosgen, 1996] widely applies to the restoration of perennial streams is based upon detailed criteria. Similar criteria for restoring smaller headwater streams that flow ephemerally or intermittently are not currently well documented. Consequently, mitigation efforts for headwater streams must be based on past experiences and documented use of best professional judgements founded upon existing technology, sound science, and data. The information derived from these experiences in the field would be embodied in the BMP mitigation manual.

This action proposes collection of information on successful restoration of aquatic and riparian habitat at mining or similar construction projects causing stream impacts. CWA and SMCRA regulatory authorities' can promote aquatic ecosystem restoration concepts through demonstration projects and also build a useful body of scientific knowledge on the application of restoration methods to mined lands. Study of headwater streams relocated on natural hillsides or placed on backfill and/or valley fills could document aquatic functional replacement. This data would become the basis for establishing future onsite mitigation requirements. The use of EPA grants or approval of these approaches under OSM's experimental practice program may be methods for increasing knowledge in this area.

Under this action, the state and Federal agencies would develop and maintain a detailed technical handbook or manual of information. The manual would build upon existing COE, EPA, OSM, and state agency publications (e.g., EPA Stream Corridor Restoration: Principles and Practices, COE Mitigation Regulatory Guidance Letters, OSM Diversion Handbook, etc.) and be tailored to coal mining situations. Periodic technical conferences would be held to develop, review, and update the manual information. The manual would include the following:

- BMPs for protection, enhancement, and development of aquatic and riparian ecological resources;
- Information on the characterization, mitigation, restoration and replacement of streams, riparian zones, and related ecological resources;
- Stream delineation guidelines developed with the cooperation of stakeholders and academia and approved by agencies that regulate mining [see Chapter II.C.4.a.5, Actions 6 and 9];
- "How-to" discussions of mitigation strategy implementation;
- An inventory of AML, active mining, construction, or other COE-approved restoration projects that demonstrate successful aquatic habitat creation, restoration, or enhancement; and,
- "Road maps" for successful partnering with case studies and comprehensive lists of necessary approvals for implementing mitigation.

The BMP manual described above could provide guidelines for ecological restoration methods complementing the engineering design and performance standards. For instance, the manual would discuss restoring aquatic habitat using innovative design, construction, and grading techniques incorporating excess spoil fill, backfill, and natural ground configurations. An explanation of SMCRA implementing regulations at 30 CFR 816.71 allow an applicant to choose different excess spoil configurations other than the typical durable rock, valley, or head-of-hollow fills specified in other OSM regulations. The difficulties of capturing groundwater moving through the mined area at the down-dip area of the "pavement" or "bench" to provide necessary water for aquatic habitat reconstruction should be incorporated. Lining any channels reconstructed on backfill to minimize infiltration should also be discussed in such a manual.

The manual might also explore different landforming concepts. Landforming concepts were advanced in the Mining and Reclamation Technology Symposium [Appendix H]. This approach could result in final backfill grades with a more natural appearance, without the straight lines usually presented by terraces on outslopes. The mining industry proposed another landforming concept to shape an excess spoil fill to create a man-made ridge line between the existing natural ridges with stream channels restored in the intervening valleys. Another proposal designed a side-hill fill with a stream channel constructed at the intersection of the fill and natural ground. Other feasible landforming opportunities may be conceived and included as the state of the science develops with additional data, experience in mitigation, and engineering design. Opportunities to employ landforming and stream restoration techniques in the mine design may provide features such as sinuosity, pools, riffles, riparian vegetation, or other appropriate aquatic habitat to replace stream function. The manual would remind the designer that use of any alternative fill configurations must simultaneously satisfy fill minimization, drainage control, long-term stability, and also conform to any other performance standards and reclamation requirements (such as erosion control, revegetation, etc.). Meeting all of these requirements may present unique design, construction, and regulatory program conflicts. Inter-governmental cooperation and flexibility are critical for implementing a comprehensive mitigation strategy.

Action 9: The COE would refine and calibrate the stream assessment protocol for each COE District where MTM/VF operations are conducted. This protocol would be used to assess stream conditions and to determine mitigation requirements as part of the permitting process. The COE would compile data collected through application of the assessment protocol and other information in a GIS database. These data would be used to evaluate whether programmatic "bright-line"

thresholds, rather than case-by-case minimal individual or cumulative impact determinations, are feasible for CWA Section 404 MTM/VF permits.

The stream assessment protocol is calibrated and in use in the portion of Kentucky under jurisdiction of the COE Louisville District. Calibration is ongoing within the COE Huntington and Norfolk Districts for use in eastern Kentucky, southwestern Virginia, and southern and central West Virginia. The COE Nashville District calibration and implementation would apply to MTM/VF proposals in portions of the eastern Kentucky coalfields and all of the Tennessee coalfields. The COE would continue to refine the stream assessment protocol as increased data and experience accrue in the Appalachian states.

The application of the stream assessment protocol, along with other baseline data, provides information on the type (ephemeral, intermittent or perennial), quality, length, and watershed size of streams being impacted. Other data from CWA, SMCRA, and NPDES permits are available, including areal extent of permit disturbances, HUC codes, land use, groundwater, additional downstream water quality/quantity, etc. Relevant data could be compiled in COE GIS databases for analysis to make permitting decisions consistent with the CWA Section 404(b)(1) Guidelines. Moreover, with sufficient information and experience, the COE may find that certain impacts (e.g., stream length lost, watershed size affected, percent of watershed disturbed, or other qualitative/quantitative resource impacts) typify projects requiring an IP process.

Under Alternative 2, the existing regional condition would continue to apply to MTM/VF proposals in certain geographic areas where impacts in watersheds larger than 250-acres would generally begin processing as IPs. This condition would apply until such time as the COE, utilizing its GIS database and analysis of scientific data, determines if programmatic individual or cumulative impact thresholds are appropriate to replace or modify the case-by-case determinations.

Action 10: Incorporate mitigation/compensation monitoring plans into SMCRA/NPDES permit inspection schedules. Coordinate SMCRA and CWA requirements to establish financial liability (e.g., bonding sureties) to ensure that reclamation and compensatory mitigation projects are completed successfully.

To ensure that adequate mitigation projects are approved in the SMCRA and/or CWA 404 permits, the application review would incorporate use of the functional assessment protocols to determine if the mitigation attains EIUs equivalent to those lost by unavoidable impacts (see Actions 5, 6, and 9 as well as the description of the existing CWA Section 404 program in Chapter II.C.4.a., above). Construction plans, specifications, time lines, and deadlines to accomplish the mitigation project(s) would be incorporated into the applicable permit (e.g., offsite mitigation in the CWA Section 404 permit and onsite mitigation in the SMCRA permit). Another permit which may cover mitigation projects is an NPDES permit, monitored by routine inspections to assure that discharges from permitted outfalls to waters of the U.S. are in compliance with the approved permit, effluent limits, and water quality standards. These various permits could provide inspectors with the plans they need to inspect and enforce the respective on- and offsite mitigation/compensation plans.

Bonding mechanisms exist under both SMCRA and CWA Section 404. These bonding mechanisms could be used in combination to provide financial assurance for the completion of compensatory mitigation projects.

This action envisions development of a state and/or Federal agency coordination process to:

- Secure joint concurrence on mitigation project design adequacy;
- Avoid "double bonding" under state and/or Federal statutes; and,
- Inspect approved mitigation projects to ensure compliance.

Coordination in these areas could involve joint meetings with the applicant; appropriate permit review sequencing, consensus selection of mitigation measures and plans; delineation of agencies' bonding responsibilities to encompass all components (offsite and onsite) of the mitigation measures; and, shared inspection duties, monitoring reports, communication regarding enforcement actions. Action 1 discusses the agencies' establishing a memorandum of understanding (MOA) including coordination procedures and a joint permit application for SMCRA and CWA 404 applicants. The MOA would also outline the process for the interaction on selection, bonding and inspection of compensatory mitigation.

This following action applies to Alternatives 2 and 3:

Action 11.2 and 11.3: The SMCRA regulatory agency, in conjunction with the PHC, CHIA, and hydrologic reclamation plan, could apply the COE's stream assessment protocol to consider the required level of onsite mitigation for MTM/VF.

SMCRA applications contain baseline data, predictions of hydrologic consequences and a reclamation plan designed to minimize impacts to the hydrologic balance, fish, wildlife, and related environmental resources. While SMCRA does not currently require biological monitoring as part of baseline stream characterization, Actions 3.2, 3.3, and 7 propose to revise the SMCRA regulations to provide a basis for application of stream assessment protocols as an integral part of baseline data collection where adverse impacts to waters of the U.S. would result from an applicant's proposal. The applicants' PHCs would detail the resources and anticipated consequences. The hydrologic reclamation plan would include onsite mitigation measures to offset unavoidable adverse impacts. The SMCRA agency would review this information, factor it into the CHIA, and the COE could substitute the resultant SMCRA plans and findings for the onsite mitigation portion of the CWA Section 404 permit. If the COE finds that SMCRA or state-approved mitigation is adequate, additional mitigation would not be required. SMCRA applicants must describe the steps to be taken to comply with CWA permit requirements, including any required compensatory mitigation measures [30 U.S.C. 1258(a)(9) and (13) and 30 CFR 780.18(b)(9)]. Selection of Alternative 1 does not include this action.

7. Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations [40CFR 1500-1508], implementing the procedural provisions of NEPA, define cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions [40 CFR 1508.7]." "Actions," as used in CEQ regulations, may include a broad range of activities from those as specific as individual construction projects to those as general as implementing regulatory programs. Individual adverse impacts from an action may be insignificant individually, but may accumulate over time from one or more origins and collectively result in significant adverse impacts that degrade important natural resources. The cumulative impacts of a

particular action can be viewed as the total effects on natural resources, socioeconomic resources, human health, recreation, quality of life aspects, and cultural and historical resources of that action and all other activities affecting those resources, compounding the effects of all actions over time.

This EIS evaluated the cumulative effects of MTM/VF on various resources, socio-economics, and the human or natural environment: Chapter III.N, Past and Current Mining in the Study Area; Chapter III.O, The Scope of Remaining Surface-Minable Coal in the Study Area; Appendix G, Post Mining Land Use Assessment--Mountaintop Mining in West Virginia, Mountaintop Technical Team Report, Phase I and II Economic Studies, Case Studies Report on Demographic Changes Related to Mountaintop Mining; Appendix I, Landscape Scale Cumulative Impact Study of Mountaintop Mining Operations and Figure III.O., The Extent of Potential Mountaintop Minable Coal.

The data compiled and technical studies performed for this EIS indicate that in 1998 the EIS study area represented about 25% of national coal production [Chapter III.N]. The 12,000,000 acres of the study area are dominated by 92% forest cover. Surface mining has disturbed about 400,000 acres in the last ten years, or about 3% of the study area. When impacts of mining, logging, and human development are combined, an estimated 11% of the forested portion of the EIS study area is projected to be deforested in a ten-year period. This estimate does not include any reforestation efforts following mining and timbering. [Appendix I] The study area is underlain by scattered but considerable remaining coal deposits; however, the portion of the remaining deposits that is minable could not be accurately estimated due to the inability to generalize site-specific mining engineering considerations on a regional scale [Chapter III.O]. Various economic evaluations [Appendix G and H] indicate that the size of valley fills is directly proportionate to the amount of coal recoverable by existing MTM/VF methods. Absolute limitations on valley fill size would result in: 1) reserves typically accessible by larger mining equipment becoming unminable; 2) more rapid depletion of reserves minable by smaller equipment spreads; 3) increased competitive pressure on central Appalachian coal from Powder River Basin, natural gas, or other imported/domestic coal sources; and 4) resultant increases in mining costs, drops in mining and related employment, decreases in severance taxes, etc. [Appendix G]

The West Virginia portion of the study area contains previously-mined or currently-permitted acreage not returned to AOC that could be developed in support of existing or future infrastructure based on population trends. One study indicated that demographic factors, such as population and economic growth, influence the demand for developable mine sites. Further, the study observed that mined sites are more developable because they do not have slope and other limitations (e.g., landslides, poorly draining soils, etc.). Rural residents in the West Virginia portion of the EIS study area could be impacted (noise, truck traffic, etc.) by future mining due to proximity within two miles or less of mining sites. [Appendix G: Yuill, 2002] The demographic data, compiled from census comparisons, indicates that population, family income, and levels of employment have been in decline within the EIS study area over several decades. Some residents interviewed from the West Virginia and Kentucky portion of the EIS study area perceived that MTM/VF negatively affected these factors, but the data showed similar declines in areas outside of the MTM/VF activities. [Appendix G: Case Studies Report on Demographic Changes Related to Mountaintop Mining]

NEPA requires that environmental, socio-economic, indirect and cumulative impacts be identified and evaluated for Federal actions [40 CFR 1508.8]. While, under NEPA, agencies must consider all impacts of their actions, the authority of a particular agency to take action to remedy those impacts may be limited [40 CFR 1500.6]. For instance, the COE's jurisdiction for controlling

environmental impacts is provided by CWA Section 404 and is generally limited to waters of the U.S. Accordingly, while broader impacts are considered, individual and cumulative impacts to aquatic resources are the portion of the COE's NEPA analysis for which impacts can be directly addressed [Appendix B to 33 CFR Part 325 - NEPA implementation procedures for the Regulatory Program]. The collective Federal involvement of the COE and other Federal agencies is sufficient to grant legal control over CWA Section 404 project aspects beyond aquatic resources (e.g., T&E species, cultural and historic resources, or SMCRA permits in Tennessee). Therefore, CWA Section 404 project effects other than aquatic resources may be considered and addressed in NEPA analysis.

The COE considers direct, indirect, and cumulative impacts of each project requiring a CWA Section 404 IP and documents those impacts as required by NEPA in the accompanying EA or EIS. The COE considers the same impacts programmatically for categories of projects of a certain size or type when CWA Section 404 NWPs are re-authorized every five years. The NEPA review for the NWP renewal has found that authorization of projects under this general permit would result in no more than minimal cumulative impact. Projects authorized under NWP need no additional NEPA compliance review. To verify NWP eligibility, the COE evaluates each project to determine if impacts are less than minimal, either individually or cumulatively. For those projects that meet the criteria for a NWP, but would have more than minimal individual or cumulative impacts, processing as an IP and separate NEPA analysis are required.

SMCRA Section 702(d) states that SMCRA rulemaking is a major Federal action requiring NEPA compliance. Consequently, OSM prepared a programmatic EIS and supplement upon promulgation of SMCRA permanent program regulations [USDI, OSM, 1979 (EIS-1) and 1983 (EIS-1 Supplement v.1)]. However, OSM delegation of SMCRA authority to each state is not a major action requiring NEPA compliance [30 U.S.C. 1292(d)]. The OSM 1979 EIS explained this SMCRA section, stating that additional NEPA review was not required upon state adoption of comparable statutory and regulatory requirements, because NEPA review occurred upon promulgation of the SMCRA regulations. That is, since state SMCRA programs must be as stringent and effective as the Federal program [30 U.S.C. 1252], NEPA compliance by OSM on state delegation of similar provisions would duplicate that done for the Federal rules. Following SMCRA program delegation to a state, each state surface coal mining permit approval is not considered a major Federal action, and NEPA compliance is unnecessary.

Unlike the other states in the EIS study area, coal mining in Tennessee is under the jurisdiction of the OSM Federal program and each SMCRA permit approval is considered a Federal action requiring NEPA review. NEPA reviews in Tennessee tier off of the SMCRA permanent program EIS, but may consider and address resource impacts from coal mining beyond the focus of CWA Section 404 NEPA reviews.

Like the COE, SMCRA NEPA compliance may consider broad environmental, socio-economic, and cumulative impacts; but SMCRA authorities can directly address only those coal mining impacts under their authorities. SMCRA, exclusive of NEPA, addresses many environmental issues, such as post mining land use, revegetation, aquatic resources, fish and wildlife resources, and offsite damage from landslides, and effects on the public including blasting, noise, water supplies and fugitive dust. SMCRA applications reviews in all states in the EIS study area consider these impacts for each mining proposal independent of NEPA. SMCRA also requires consideration of the cumulative hydrologic impacts of existing and anticipated surface coal mining operations.

This EIS proposes a number of actions (reduced stream loss, reforestation, air quality controls, improved water quality) described under the various issues of this Chapter, that minimize cumulative impacts on the natural and human environment. A cumulative impact action, discussed below and applicable to all alternatives, is the continued collection and analysis of environmental and socioeconomic information and development of cumulative impact thresholds for regulated activities.

a. No Action Alternative: The Regulatory Program Today

a.1. CWA

NEPA Role in CWA Section 404 Cumulative Impact Analyses

This document has previously described how CWA Section 404 applications consider cumulative impacts in the NEPA context for general and individual permits. When the NWP permits are initially issued, they undergo a NEPA analysis for a category of activities to determine that, individually and cumulatively, the projects would result in no more than minimal aquatic impacts. NWP 21 specifically authorizes the category of coal mining-related fills in waters of the U.S. To verify NWP 21 eligibility, the COE evaluates each project case by case to determine if impacts are no more than minimal, either individually and cumulatively. Projects authorized under an NWP need no additional NEPA review. Some projects may qualify for a NWP, but would have more than minimal impacts, either individually or cumulatively. If this is the case, processing as an IP with a separate NEPA analysis is required.

For IP applications, the COE establishes whether an EA/FONSI or EIS is needed to address the impacts of fills in waters of the U.S. Regardless of the scope of the Federal action, the COE considers all impacts of its action, including indirect (or growth-inducing) effects [40 CFR 1508.8]. The scope of the NEPA analysis by the COE includes the environmental impacts on portions of a project that extend beyond waters of the U.S. where there is combined involvement of the COE and other Federal agencies. In determining whether sufficient combined Federal involvement exists to expand the NEPA analysis to upland portions of a project, the COE considers whether other Federal agencies are required to take Federal action under the Fish and Wildlife Coordination Act [16 U.S.C. 661 et seq.]; the National Historic Preservation Act of 1966 [16 U.S.C. 470 et seq.]; the Endangered Species Act of 1973 [16 U.S.C. 1531 et seq.]; Executive Order 11990, Protection of Wetlands, [42 U.S.C. 4321 91977]; and other environmental review laws and executive orders. Once the scope of analysis has been defined, the NEPA analysis for the proposal would include direct, indirect and cumulative impacts. The COE, whenever practicable, incorporates by reference environmental reviews conducted by other Federal, and integrates state agency reviews, as appropriate. [Appendix B to 33 CFR Part 325 - NEPA implementation procedures for the Regulatory Program.]

The COE is guided in its cumulative impact review of IPs by regulations at 33 CFR 325.3(c)(1), generally described as follows. The decision whether to issue a CWA Section 404 permit is based on the evaluation of the probable impacts, including cumulative impacts, of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The projected benefits of the proposal must be balanced against its reasonably foreseeable detriments. All factors relevant to the proposal, including their cumulative effects, are considered. These factors include conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water

supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and in general, the needs and welfare of the people.

CWA Role in Cumulative Impact Analyses

In addition to NEPA's broader cumulative impact reviews of several types of environmental resources, the goal of the CWA in protecting the integrity of the nation's waters necessitates that cumulative impacts on aquatic resources be considered in project reviews. For MTM/VF and their outfalls in waters of the U.S., CWA Sections 303, 401, 402, and 404 play a role in addressing cumulative impacts. These sections were previously outlined or discussed as they pertain to water quality in Chapter II.C.4.a.

A CWA Section 404 permit cannot be issued without a state CWA Section 401 Certification that state water quality standards will not be violated by authorizing the proposed activity. The state may consider both the individual water quality impacts of the project and impacts of the project in light of other activities in the watershed, technology-based effluent limits, water quality standards, TMDLs (if applicable), and antidegradation requirements. The anti-degradation requirements work to reduce or eliminate cumulative impacts by providing a process to maintain existing water quality levels to meet intended uses. If individual or cumulative effects of a project violate state water quality requirements, the state may deny certification. The state certification may include special conditions to protect or restore water quality. These conditions subsequently become part of the CWA Section 404 permit. The COE presumes that a state water quality certification satisfies the requirements of CWA Section 401; the CWA Section 404(b)(1) Guidelines relevant to water quality under 40 CFR 230.10(b)(1); and the COE rules at 33 CFR 320.4(d). Therefore, the COE views the state water quality certification as satisfying the water quality portion of cumulative impact analysis [COE RGL 90-4; Water Quality Considerations].

EPA has a role in the review of COE CWA Section 404 permit authorizations. When the COE considers issuance of an IP, CWA Section 404(q) and Section 404(c) provide dispute resolution processes for the COE and EPA regarding individual or cumulative adverse impact determinations. [Chapter II.C.1.]

a.2. SMCRA Cumulative Hydrologic Impact Analyses (CHIA)

SMCRA Section 507(b)(11) requires the applicant to provide "a determination of the probable hydrologic consequences (PHC) of the mining and reclamation operations, both on and off the mine site, with respect to the hydrologic regime, quantity and quality of water in surface and ground water system including the dissolved and suspended solids under seasonal flow conditions and the collection of sufficient data for the mine site and surrounding areas..." The PHC allows an assessment "made by the regulatory authority of the probable cumulative impacts (CHIA) of all anticipated mining in the area upon the hydrology of the area and particularly upon water availability...." [30 U.S.C. 1257].

The CHIA is performed for a watershed, the cumulative impact area (CIA), defined by the regulatory authority based on the hydrology of the area. The SMCRA regulations require "[H]ydrologic and geologic information for the cumulative impact area necessary to assess the probable cumulative hydrologic impacts of the proposed operation and all anticipated mining on surface- and ground-water systems..." [30 CFR 780.21]. The size of the CIA must be large enough to encompass a number of mining operations, but not so large that the influence from mining

operations on the hydrology cannot be detected. CIAs in the EIS study area tend to comprise watersheds of 10,000 to 40,000 acres of similar geologic characteristics and hydrologic connectivity.

A CHIA is updated with each new mining proposal to assure that additional impacts within the CIA do not result in unacceptable adverse impacts to surface water quantity and quality. Unlike the assessment required under the CWA of all sources of aquatic impacts within a watershed, the CHIA only requires consideration of cumulative impacts from known and anticipated coal mining within the CIA. However, in assessing the impacts of coal mining, the CHIA considers the overall water quality of the watershed. A CHIA determines whether the proposed operation is designed to prevent material damage to the hydrologic balance outside the proposed permit area. This provides an opportunity for SMCRA to identify and evaluate cumulative impacts to surface and ground-water systems from mining and other human activities in the area. In addition to the CHIA, where NEPA applies (e.g., Tennessee), all impacts must be disclosed, including direct, indirect (e.g., growth-inducing) and cumulative impacts, and OSM must consider all reasonably foreseeable actions together with mining operations [40 CFR 1508.7 and 1508.8].

To better facilitate the preparation of CHIA documents by the various SMCRA regulatory programs, OSM developed a technical reference document entitled "Permitting Hydrology, A Technical Reference Document for Determination of Probable Hydrologic Consequences (PHC) and Cumulative Hydrologic Impact Assessment (CHIA)--Baseline Data" [http://www.osmre.gov/pdf/phcchiareport.pdf] This guidance document assists in the preparation and review of proposed surface coal mining operations by outlining a sound technical approach for obtaining the geologic and hydrologic information to meet baseline data requirements needed to support development of PHCs and CHIAs. To finalize this document and facilitate its acceptance and use by both the coal producers and the various SMCRA regulatory agencies, OSM organized and participated in an intergovernmental workshop on PHC/CHIAs.

The amount and type of hydrologic data varies from state to state, but similar data sources are used to compile PHC/CHIA analysis input. SMCRA and NPDES require upstream and downstream water quality monitoring of permitted outfalls at existing mining operations (see Chapter II.C.4.a.6). Data from other surface water quantity and quality monitoring points are part of the SMCRA baseline information before mining and approved surface water monitoring plans during mining. These data sources are closest to the mining disturbance and they provide indications of upstream hydrology in the CIA, and provide compliance data on particular pollutant loadings. Various monitoring stations accumulate watershed information characterizing the downstream reaches of the CIA. At the downstream limit of the surface water component of the CIA, several states have developed "trend stations." Water quality and quantity information collected at these trend stations indicates background conditions and provides the basis for both detection of potential influence from upstream mining operations and modeling or other forms of predictive analysis. Some relevant historical or current hydrologic monitoring data may be available, including U.S. Geological Survey (USGS) and COE stream gauging stations, USGS NAWQUA, WATSTORE and STORET hydrologic data, state CWA antidegradation monitoring points, and other state water quality basin survey locations.

Limitations of the existing trend analysis systems include the following: water chemistry data collection is focused solely on coal mining impacts; stations were not randomly selected and may not be statistically located; concerns have been expressed as to excessive watershed size; there are no reference stations in the system (stations on undisturbed streams of similar size and geology); no

biological data are collected; and all existing data (TMDL, NPDES, USGS NAQWA, EQUIS, etc.) are not available in a single GIS database. Integration of all these data sources in one GIS system would be beneficial to applicants, the public, and regulatory agencies.

Requirements for both PHCs and CHIAs are general performance-type standards that identify hydrologic objectives but do not prescribe exact methodologies for predicting hydrologic impacts. The CHIA is an assessment based upon available information and results in defining the incremental hydrologic impacts of the proposed operation in combination with the impacts of all other existing and anticipated mining within the CIA. SMCRA regulatory authorities have the flexibility to combine data specifications, verifications and controls for technically-sound hydrologic impact analyses and supportable permitting decisions. Typically, based upon the predicted loading from all coal mining outfalls in the CIA, the water quality at the trend station or other CIA analysis point is evaluated to determine if effluent limits or in-stream standards would be exceeded. A general discussion of how the states in the EIS study area perform CHIAs follows:

- Kentucky-In 1982, KYDSMRE modeled anticipated loading for coal mining indicators of TDS and sulfates in eleven eastern Kentucky watersheds ranging from 90,000 to 1,400,000 acres (based on USGS HUC-8 watersheds). This Stream Quality Unit Response Model (SQURM) performs long-term predictions based on estimates of loading derived from existing water quality and past coal mining disturbance. For instance, the model predicts the year that TDS concentrations could exceed secondary drinking water standards when mining production surpasses a particular rate. KYDSMRE is currently converting the Fortran-based model to the Windows environment. KYDSMRE will subsequently validate and calibrate the model predictions with stream quality and quantity data collected since 1982 from mining operators SMCRA and NPDES monitoring, USGS data, Kentucky Division of Water basin surveys or antidegradation information, and other available sources. Preliminary evaluation of SQURM predictions indicate close correlation with actual data. Updating the model will allow subdivision of the large watersheds to calibrate SQURM predictions for smaller basins. KYDSMRE anticipates linking existing hydrologic data through GIS to the SQURM model.

- Tennessee-In 1985, OSM established 189 trend analysis stations in sub-watersheds of 6,000-14,000 acres. Downstream monitoring stations, usually located in smaller watersheds (<several hundred acres), are also established by the operators for NPDES and SMCRA discharges associated with mining. The CHIA assumes worst-case conditions as if the total area of active and proposed mine sites are simultaneously disturbed. Drinking water standards for parameters such as sulfates may also be used as material damage thresholds where other life use criteria are not established. If the CHIA predicts any parameters in excess of thresholds, the state water quality agency is notified and additional surveys of water quality and benthics occur. If the state water quality agency determines that supported uses can be maintained, the proposed project may be approved. All of this information is in GIS or other databases; however, the data are not integrated to provide ready access for permit reviewers or other stakeholders. OSM plans to explore the use of models, similar to those under consideration by WVDEP, for CHIA preparation.

- Virginia-Virginia utilizes the USGS HUC-14 watershed classification for 25-30 CIAs, ranging from 10,000 to 40,000 acres. SMCRA permit boundaries and monitoring stations, and NPDES monitoring information are in a GIS, and, other hydrologic information databases for the basis for VADMLR CHIAs. Trend stations are not established in Virginia; however, trend analyses of applicant monitoring data provide for comparative CIA watershed quality and quantity as part of the CHIA. Many Virginia coalfield streams have been adversely impacted by past coal mining and are subsequently included on CWA Section 303(d) lists of impaired waters. The majority of new coal mining proposals reaffect or remine previously-mined areas. Therefore, VADMLR CHIAs tend to evaluate whether or not a proposed coal mining project will improve watershed health in addition to assuring that material damage outside the permit are will not occur.

- West Virginia-WVDEP delineated CIAs based on the hydrology of the area. WVDEP, with OSM assistance, recently established a system of 240 trend analysis stations in 20,000- to 30,000-acre coalfield watersheds. Trend stations were located based on professional judgement (similar geology, hydrologic connectivity, etc.), logistical, and budget considerations. The data from these trend stations assist in preparation of PHCs and CHIAs. The trend stations sometimes correspond with downstream limits of the CIA and are located downstream of NPDES baseline water quality stations (BWQs). BWQ sites, nearer to the proposed mining operations in watersheds of several hundred acres or less, are selected by WVDEP. BWQ points are monitored by the operator before and during mining for pH, flow, iron, manganese, and sometimes aluminum or other identified pollutants of concern. Within these stream monitoring areas, there are also 12 existing USGS gaging stations. For detailed information on the WVDEP CHIA process, see Chapter 32 of the WVDEP Mining Permit Handbook [http://www.dep.state.wv.us/Docs/66sect32.pdf].

  WVDEP hydrologists and geologists assess this information to make a determination as to whether the hydrologic assessment of the CIA indicates that the addition of the proposed operation to all probable cumulative impacts of all anticipated mining may cause more than minimal disturbance to the hydrologic balance within the permit area and adjacent areas, or may cause material damage to the hydrologic balance outside the permit area.

  The WVDEP is currently compiling mining information on a data base to facilitate electronic permitting and public access to information. WVDEP plans to examine the various hydrologic data, using models such as the Watershed Characterization Modeling System(WCMS) developed at West Virginia University along with the USGS Hydrological Simulation Program-Fortran (HSPF) and Mining Data Analysis System(MDAS) developed by Tetra Tech, Inc. to perform CHIAs.

Beyond the CHIA, the SMCRA program also addresses aspects of mining impacts on other natural and human environmental resources through performance standards in the areas of: protection of terrestrial ecosystems; topsoil and subsoil; protection of specific land uses; protection of air quality; noise and vibration; explosives; community integrity and quality of life; post mining land use; excess spoil; coal mine waste disposal; backfilling and grading; revegetation; and roads. While

these performance standards apply to individual mine sites, cumulatively they minimize effects and thus can be relied upon by the COE in their cumulative impact analysis.

b. Alternatives 1, 2, and 3

Action 12: The COE, with assistance from the other agencies, would compile data collected through application of the stream functional assessment protocol, along with PHC, CHIA, antidegradation, NPDES, TMDLs, mitigation projects, and other information into a dynamic GIS database for evaluating and tracking aquatic cumulative impacts. These aquatic and other relevant data would be used to determine the extent of cumulative impact areas for appropriate resources and ascertain whether a programmatic "bright-line" cumulative impact threshold is feasible for CWA Section 404 MTM/VF permits.

This action proposes use of information technology for compiling aquatic resource and other relevant information, as well as defining and analyzing cumulative impact areas in order to satisfy both the CWA Section 404 and NEPA cumulative reviews. As previously described in this section, the COE must consider the individual and cumulative effects of proposed projects on aquatic resources to comport with CWA Section 404(b)(1). Moreover, for those projects resulting in more than minimal individual or cumulative effects (i.e., proposals requiring IPs), the NEPA cumulative assessment of project impacts on broader environmental resources must be part of an accompanying EA or EIS.
The scope of the NEPA analysis relative to MTM/VF may involve several Federal agencies because of T&E species, historic properties, a Federal coal mining permit on state or Federal lands, etc. This action would involve developing an interagency, interdisciplinary approach for NEPA and CWA aquatic cumulative impact assessments, including definition of the cumulative impact area for each resource of significance.

b.1. Data Integration

CWA aquatic resource data

Chapter II.C.4, Stream Impairment, II.C.5, Assessing and Mitigating Stream Habitat and Aquatic Functions, and this cumulative impact section describe a variety of CWA criteria and programs to maintain and restore water quality and aquatic resources. Collection of background aquatic data, impact predictions, and monitoring are fundamental components to accomplish CWA program goals. SMCRA shares this approach and, in combination with data generated in CWA implementation, these statutes provide extensive arrays of information that would be useful in cumulative impact determinations. Because these data are collected for different purposes, by different agencies, and by different methods, the information is only rarely viewed in an integrated fashion. With the advent of GIS and automated data processing, integration is feasible but requires screening and conversion of these multiple data sources to assure functional compatibility. Data resolution (statistically valid, representative of the area, and dependent on scale), identifying data gaps, and adequate methods for evaluation of both individual project and cumulative human impacts are other important factors requiring consideration in assembling appropriate data elements. Temporal factors are also key to the spatial distribution and analysis of data. Data reliability may turn on how recently the data were collected due to improved collection, testing, and analytical methodologies.

Water quality and quantity data are available from NPDES and SMCRA monitoring, antidegradation stream classification baseline water quality sampling (also CWA Section 303(d) stream data), TMDLs, USGS, requisite COE stream functional assessment protocol, and other state water quality and stream condition index surveys. Modeling and other analytical predictions have been performed to evaluate potential impacts of mining and other watershed disturbances (e.g., PHCs and CHIAs; other classes of CWA Section 404 permits, such as road crossings, wetlands, dredging, etc.; and other human activities such as community development, logging operations, utilities, and other infrastructure). These data, once assembled in geospatial context, would serve as a basis for cumulative impact area demarcation and as the foundation for other data collection to fill gaps for cumulative impact analyses. Ultimately, assembling and evaluating these data may indicate that standardized data collection methods are advisable to eliminate dissimilarly collected or analyzed data. Standardization could raise the confidence level and usefulness of the varied data sources in maintaining or restoring water quantity and quality. The MOA and joint permit application proposed in Action 1 in the previous section on government efficiency [Chapter II.C.1] could address ways to achieve standardization between the CWA Section 404 and SMCRA regulatory programs.

Sharing and integrating these data would not only allow CWA Section 404 project impact analysis in an individual or cumulative sense but also provide valuable information for consideration in renewing NWP21 or setting impact thresholds for NWP 21; issuing state CWA Section 401 Certifications; developing TMDL plans and waste load allocations; and reviewing NPDES and SMCRA permits. This action would promote evaluation of science-based cumulative and individual impact thresholds for MTM/VFs, if it is possible to replace current case-by-case impact determinations. This action was envisioned by the COE in the preamble of the 2002 NWPs [67FR 2020-2095] and is discussed in this EIS [Chapter II.C.1.a.1; Chapter II.C.5 (Action 6), and Chapter II.C.6 (Action 9)].

NEPA resource, ecosystem, or human community data

NEPA cumulative analysis for CWA Section 404 IPs must encompass human actions, impacted environmental resources, and ecosystems, so that the effects of the proposed action are examined. Analysis includes indirect and direct effects on the following values: aquatic, terrestrial, cultural, historic and air resources; aesthetics; socioeconomics; and public health. In performance of the NEPA analysis of the specific action proposed, consideration must include reasonably foreseeable actions in the area that may influence these values.

The COE, in the exercise of its CWA jurisdiction, focuses principally on aquatic resource impacts. COE review of an IP application for MTM/VF activities expands the focus to a broader NEPA compliance analysis and consideration and documentation of each affected non-aquatic resource, ecosystem, and human community, as described above. NEPA documents inform the decision maker and the public of project consequences, individually and cumulatively, regarding impacts that may result from the project and other human activities in the cumulative impact area.

In those circumstances when the COE considers non-aquatic resources, such as terrestrial T&E species or critical habitat, in its regulatory review process as described above, the COE NEPA analysis becomes more detailed for this particular resource due to ESA protections [Chapter II.C. 11]. Where non-aquatic resources are impacted, the NEPA alternatives analyzed would concurrently look for ways to accomplish the project purpose while minimizing aquatic and T&E species impacts.

Impacts to upland and aquatic T&E species are addressed in the SMCRA permit process through consultation or coordination with FWS. The COE NEPA analysis could rely on the SMCRA permit for this information. When it is reasonably foreseeable that the natural resources, ecosystem, and human community will be affected but those impacts are not addressed by a particular Federal statute or regulatory program (e.g., CWA, ESA, NHPA, SMCRA, FWCA, etc.), the COE can document these cumulative impacts in the NEPA document for an IP as these impacts relate to the proposal to fill waters of the U.S. In these cases, a proposed MTM/VF IP could result in deforestation, noise, or other impacts to resources beyond COE jurisdiction. The alternatives in the NEPA review will look to various ways to accomplish the project purpose, while minimizing aquatic resource impacts. These alternatives may incidentally lessen or increase affects to other non-aquatic resources, but are geared to the COE jurisdictional decision at hand.

The use of GIS to compile other relevant resource, ecosystem, or community information is a logical augmentation to the aquatic data for use in COE NEPA compliance. Use of information technology and GIS to collect and update these non-aquatic environmental resources and other cumulative effects data will not only aid in current COE NEPA compliance, but build a reference library to better inform future decisions.

The data collection mandated by different regulatory programs results in voluminous information, typically only assessed for particular program requirements. The collective cost of this data collection and analysis is considerable. Compiling similar data from other varied sources could add value by serving multiple program goals and objectives [see Chapter II.C.1]. In summary, collecting, compiling, screening, and updating aquatic and other resource information in GIS, linked to various databases, will allow more-informed, expeditious COE CWA Section 404 and NEPA cumulative impact considerations. This is particularly true for MTM/VF applications within the EIS study area, where considerable coal resource remain and continued receipt of new mining proposals is certain.

b.2. Delineation of Cumulative Impact Areas (CIAs)

Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries. Resources typically are demarcated according to agency responsibilities, county lines, magisterial districts, or other administrative or political boundaries. Because natural and sociocultural resources are not usually so aligned, each political entity actually manages only a portion of the affected resource or ecosystem. Cumulative effects analysis on natural systems must use natural ecological boundaries and analysis of human communities must use actual sociocultural boundaries to ensure consideration of all effects. Further, project-specific analyses are usually conducted on the scale of counties, resource management units (e.g., forests,), installation boundaries, or merely project boundaries; whereas, cumulative effects analysis should be conducted on the scale of human communities, landscapes, ecosystems, watersheds, airsheds, or viewsheds. Therefore, definition of the appropriate CIA and scale (data resolution) for each resource, ecosystem, or human community is an important step prior to cumulative impact analysis.

CWA Section 404 CIAs

The extent of the CIA for aquatic resource cumulative impact analysis should be large enough to encompass the hydrologic regime contributing to the aquatic ecosystem affected by existing and reasonably foreseeable activities. However, the CIA size should not be so large as to reduce

sensitivity or prevent meaningful consideration of predicted impacts for individual and multiple projects. This section earlier described how SMCRA evaluates cumulative impacts from surface coal mining operations on the hydrologic balance (i.e., CHIAs) in geologically similar conditions of hydrologic connectivity, typically a certain-sized watershed. Based on evaluation of the compiled available data using a GIS, as conceptualized with this proposed action, the COE may deem the SMCRA CIA as an appropriate boundary for CWA Section 404 and NEPA analyses of cumulative aquatic impacts. However, since CWA review evaluates all aquatic resource effects within a watershed and not just coal mining impacts, the COE may conclude that smaller or larger CIAs are warranted. Where "piggybacking" on the SMCRA CIA is appropriate, the COE would rely, to the extent practicable, on SMCRA CHIAs as the foundation of the CWA Section 404(b)(1) individual and cumulative impact prediction. The COE can augment the CHIA with the functional stream assessment protocol and other hydrologic data described above to make the required regulatory and NEPA determinations.

CWA Section 404 IP NEPA cumulative impact areas

The extent of CIAs often varies by resource, i.e., the watershed, viewshed, airshed, or other resource areas may not coincide with one another. An interdisciplinary approach is essential to evaluate the cumulative effects to each resource, ecosystem, or human community. McHarg was credited with developing a model in 1969 [*Design with Nature*], coinciding with enactment of NEPA, whereby land use, archaeology, wildlife, vegetation, flood plains, hydrology, slope, soils, geology, and other factors were superimposed to determine the capability of the land to support human activity and the land's suitability for a particular type of development. This process was a precursor to current-day GIS analysis, as envisioned by this action. Creating GIS data layers for each resource, ecosystem, or human community, allows evaluation of each layer individually, or in combination with other layers, and does not necessarily rely on coincident boundaries for each factor assessed.

Data Analysis

The GIS cataloguing of various data types creates the ability to use GIS models, or export the data to other predictive models. Similar to the evolving use of technology to perform the CHIA required by SMCRA, the COE would develop and continually improve comprehensive analytical and predictive technology to implement this action and conduct the CWA and NEPA cumulative impact reviews.

b.3. Establishing Cumulative Impact Thresholds

If the COE determines that the individual aquatic resource impacts of a MTM/VF proposal are more than minimal, the application must undergo IP processing to consider if a CWA Section 404 permit authorization is possible. Moreover, a MTM/VF proposal with individual effects that are less than minimal may contribute to impacts that are cumulatively more than minimal within a CIA. In such a case, IP processing is also required. The *Bragg* settlement agreement recognized the CWA Section 404 distinction between individual and cumulative minimal impacts. The settlement agreement generally established, for proposals in West Virginia, that if the toe of an individual valley fill is in a watershed less than 250 acres, minimal impacts would result (and thus NWP 21 applicability). The agreement further provided that if multiple individual fills within 250-acre sub-watersheds (i.e., part of a larger CIA) have more than minimal cumulative impacts, then IP processing is required. This agreement created a programmatic threshold for NWP 21 that is similar in concept to minimal

impact thresholds for CWA Section 404 general permits for wetlands and stream crossings. No similar cumulative impact threshold was defined by the *Bragg* settlement.

The 250-acre general minimal impact threshold was intended as an interim threshold based on the assumption that this EIS would find the basis for some other threshold for NWP 21 applicability. Options explored for this EIS to address cumulative impacts included the following:

- preserving/restoring equal lengths of streams lost to valley filling (within the basin affected);
- preserving 50% of first-order streams in a second-order watershed;
- establishing a general 250-acre minimal impact threshold for all MTM/VF activities;
- establishing various minimal impact thresholds less than 250 acres (35, 75, and 150 acres); and
- requiring CWA Section 404 IP processing when more than 4 fills per project are proposed or when more than 10% of total stream length in a defined CIA would be impacted by MTM/VF activities.

Based upon the fact that there have been 5 individual permit applications compared to the 81 projects approved under NWP 21 in West Virginia, it appears applicants are designing the majority of MTM/VF proposals to stay below the 250-acre minimal impact threshold and thereby avoid the IP process. If applicants considered this 250-acre threshold more as an absolute limit for valley fills, then adoption of a smaller watershed size as a minimal impact threshold may have similar results. Because the absolute limits of fills to watersheds of 35, 75, and 150 acres were considered in this EIS [see Chapter II.D.2], the economic and environmental effects of limiting fills to these watershed sizes provides some basis for comparison of these watershed sizes as a substitute for the 250-acre minimal impact threshold. Analysis of smaller watershed sizes as fill restrictions indicated the following:

- Fill restrictions may result in a smaller direct impact to each headwater stream as a result of the fill footprint. However, many small fills within a watershed may be necessary to meet project needs, resulting in greater cumulative impacts from the multiple fill footprints.

- Smaller fills may not reduce water quality impacts downstream. Many small fills may cause greater water quality impacts than fewer large fills.

- Coal reserves available with current surface mining methods are reduced by fill restrictions. Coal reserves rendered unavailable under these restrictions may never be extracted given the current mining technology.

- Fill restrictions may accelerate the depletion of available reserves at current levels of coal consumption.

- Mining and utility costs may increase with fill restrictions. Severance taxes and employment may decline.

Scientific data collected as part of this EIS do not indicate a programmatic "bright line" minimal or cumulative impact threshold applicable in all circumstances. No direct causal links between

environmental impacts and the size, age, or number of fills could be established with the available data. While useful data were collected and subsequent findings made during this EIS, the data and analysis could not result in statistically valid conclusions concerning duration, extent and magnitude of downstream impacts. Watershed impacts directly attributable to mining and fills could not be distinguished from impacts due to other types of human activity. Consequently, a "bright line" cumulative impact threshold could not be developed and supported.

The COE underscored this position upon re-issuance of NWP 21 in January 2002, deciding that case-by-case determination of project impacts was warranted due to the different site-specific project details and aquatic resource characteristics. The COE responded to comments regarding appropriateness of impact thresholds in that rulemaking, explaining that high quality watersheds less than 250 acres exist and lower quality watershed greater than 250 acres exist. The COE explained that use of particular thresholds could result in a proliferation of smaller valley fills in lieu of larger valley fills that might not be the best outcome for the aquatic environment. The COE did not rule out future development of thresholds through the public notice and comment process as regional permit conditions or upon consideration of relevant information becomes available through the appropriate development of criteria or NWP 21 modification. [67 FR 2042.]

This proposed action, part of all alternatives, depends on the development of a GIS with statistically valid data for cumulative impact analysis. This tool could provide a basis for determining CWA individual or cumulative minimal impact thresholds for MTM/VF projects. Similarly, in the NEPA context, the significance of impacts to non-aquatic resources, ecosystems, or human community values, may emerge with compilation and appropriate modeling analyses of GIS data.

8. Deforestation

The importance of terrestrial habitat is discussed in Chapter III.F: Appalachian Forest Communities. Four technical studies were conducted in West Virginia that included considerations of soil microbiology, terrestrial wildlife, vegetation, and cumulative impacts to interior forest cover. These studies are presented in Appendix E: Terrestrial Plant (Spring Herbs, Woody Plants) Populations of Forested and Reclaimed Sites; Terrestrial Vertebrates (Breeding Songbird, Raptor, Small Mammal, Herpetofaunal) Populations of Forested and Reclaimed Sites; Soil Health of Mountaintop Removal Mines in Southern West Virginia; and Bird Populations Along the Edges. In addition to these studies, OSM conducted a literature review of soils and forest productivity [Chapter III.B.4.].

The cumulative impact study evaluated ecological condition, biodiversity, forest loss and forest fragmentation. The 12,000,000 acres of the study area are dominated by 92% forest cover. Surface mining has disturbed around 400,000 acres in the last ten years, or about 3% of the study area. When impacts of mining, logging, and human development are combined, an estimated 11% of the forested portion of the EIS study area is projected to be deforested in a twenty-year period (between 1992 and 2012). This estimate does not recognize any reforestation efforts following mining and timbering and assumes all lands disturbed will remain unforested [Appendix I, Landscape Scale Cumulative Impact Study of Mountaintop Mining Operations.]

The EIS, OSM literature search, and other studies generally report the following as a result of MTM/VF activities within the central Appalachian region:

- fragmentation of the valuable eastern, mixed mesophytic interior forest;
- ecosystem conversion from forest to other land uses;
- reclamation with trees on mountaintop mining sites has not been particularly successful because of over-compaction, competition with trees from grasses and legumes planted for erosion control, and grazing wildlife;
- reclamation techniques may impede rates of natural succession on sites without reforestation as part of the post mining land use;
- density, height, and expanse of grasses act as barriers to forestry seed dispersal, germination, and survival;
- minesoils at study sites are approaching stable, developed soils that could develop properties similar to native soils;
- mine sites revegetated with a growth medium of certain organic material and topsoil substitutes promotes reforestation with yield potential greater than native soils;
- some forest interior species (e.g., certain neotropical songbirds, raptors, amphibians, etc.) are negatively impacted by forest loss, fragmentation, and grassland conversion; and
- some edge and grasslands species (e.g., certain reptiles, birds, mammals, raptors, etc.) are positively impacted by the terrestrial habitat diversity.

Currently, a mine site is usually logged before mining, and economically recoverable forest products are removed from the site. The remaining forest material may be subsequently windrowed at the edge of the mine site to provide wildlife habitat enhancement. Some portion may be burned and/or buried beneath the backfill. Use of these remaining organic by-products as soil amendments and mulch could augment reclamation. A best management practices (BMP) manual could describe these and other practices for developing the reclamation/revegetation plans and enhance reforestation efforts.

Selection of ground cover species for reclamation within the EIS study area has typically been oriented to those species relatively easy to establish for maximum control of erosion, with minimal post-mining maintenance or management costs required. Consequently, the post mining land uses often selected minimize or eliminate the reestablishment of trees. Post Mining Land Uses (PMLUs) without trees were historically perceived to be easier to achieve and less costly, as well as result in a shorter liability period for release of performance bonds. Therefore, PMLU selection is a key factor in the establishment of tree species on reclaimed mined land. A BMP manual emphasizing the latest cost-effective reforestation techniques could encourage forestry-related PMLUs.

Where trees are planted without use of the latest techniques to reduce compaction and provide suitable tree-rooting medium, growth rates are typically lower than prior to mining. OSM and SMCRA state regulatory agencies have recognized for some time that effective reforestation of mined lands could be more prevalent and should be encouraged. Research at Virginia Polytechnic Institute and State University (VPI) and the University of Kentucky demonstrated that far more productive forest land could be created during the reclamation process than existed on un-mined land. One forestry reclamation approach developed at VPI entails loosely grading 3 to 4 feet of surface soil and/or weathered, sandstone overburden taken from the surface 10 feet of the mined area. Also, woody debris and native seeds should be included in the growth media, where possible. (Burger and Torbert, 1992; Torbert et al., 1994) A BMP guide could describe cost-effective practices for developing suitable growth media as part of the reclamation/revegetation plans that could enhance reforestation efforts.

In addition, this research documents that mine site reforestation can be more cost-effective than other types of revegetation. It is possible other economic incentives could encourage reforestation. For instance, air quality regulations imposing legally-binding carbon dioxide limitations could be developed to create a market demand for "carbon credits" among the electric utility and coal mining industries. Such rules could create tradable air pollution credits obtained through the estimated amount of carbon sequestration associated with successful tree planting and maintenance. A BMP manual could explain eligibility for such credits and other incentives to encourage reforestation on mined lands.

Recognizing the historic difficulties associated with successful, productive establishment of forest communities on reclaimed mine sites; the opportunities for improved land productivity and economic incentives; and the potential environmental impact that loss of forest habitat may have, OSM began a "Reforestation Initiative." The initiative promotes the use of trees in reclamation and, when trees are used, promotes reclamation techniques that improve site productivity to levels meeting or exceeding those prior to mining. As part of the initiative, OSM has identified impediments to the successful use of trees in reclamation. OSM and the states have conducted numerous interactive forums and symposia for government and private interest groups to promote the benefits and methods of reclaiming with trees. Pilot projects and partnerships with various government and private interests have also been conducted to demonstrate effective and economical reclamation with trees. A BMP manual could document the forestry reclamation knowledge gained from these outreach efforts.

The state SMCRA regulatory programs within the EIS study area have also recognized the need to improve reclamation practices as related to the establishment of trees. These state programs have taken the initiative in developing their own regulations or guidelines to enhance reforestation. For example, West Virginia has worked with forestry experts to promulgate regulations that require salvaging and redistribution of four of the upper ten feet of organic and weathered subsoil and overburden as the preferred growth medium and set target yields to ensure the success of commercial forestry PMLU. Virginia and Kentucky state guidelines for reforestation also reflect the state-of-the-art in forestry reclamation. Although it is too early to fully evaluate the success of these recent Federal and state initiatives, it is reasonable to assume that these efforts have, to varying degrees, made improvements in 1) selection of the most appropriate growth medium for establishment of trees on reclaimed mine sites, 2) reducing soil compaction of the growth medium, 3) using less competitive herbaceous ground cover species, and 4) creating more effective standards for measuring success of revegetation efforts.

a. No Action Alternative: The Regulatory Program Today

The CWA program does not directly address terrestrial impacts such as deforestation or forest fragmentation. However, the CWA indirectly addresses such impacts where erosion control of upland activities is required to maintain water quality standards and riparian vegetation mitigates fill impacts to aquatic resources. The Clean Air Act may provide incentives for planting trees on surface coal mining sites to offset carbon dioxide emissions from electrical generating facilities.

The SMCRA regulatory program provides no mandate that mined land must be returned to forest. The choice of vegetative cover is a function of the desired post mining land use (PMLU) for a mine site. The PMLU is selected by the landowner and mining company, as long as the SMCRA regulatory authority finds that the operator will "restore the land affected to a condition capable of

supporting the uses which it was capable of supporting prior to any mining, or higher or better uses." [30 U.S.C. 1265 (b)(2)] OSM regulations at 30 CFR 816.97 also require operators to, "the extent possible using the best technology currently available, to minimize disturbances and adverse impacts of the operation on fish, wildlife, and related environmental values and to achieve enhancement of such resources where practicable." [30 U.S.C. 1265(b)(24)] The SMCRA program reclamation performance standards indirectly relate to the ability of reclamation to address deforestation impacts; however, OSM has not prescribed detailed techniques to meet these standards because of the wide diversity of conditions throughout the nation's coalfields.

a.1. CWA Program

The COE considers terrestrial impacts as part of the NEPA review for IPs. The protection and/or restoration of forested riparian habitat as part of aquatic resource enhancement may result in mitigation credit by the COE for CWA Section 404 permits [RGL 02-02]. Additional guidance regarding the appropriate use of vegetated buffers as a component of compensatory mitigation is currently under development. The establishment of buffers in riparian areas may only be authorized as mitigation if the District Engineer determines that this is best for the aquatic environmental on a watershed basis.

a.2. DOE Program

Carbon sequestration is the net removal of carbon dioxide (CO_2) from the atmosphere into such things as biomass (e.g., trees), products created from biomass (e.g., lumber), living biomass in soils (e.g., roots and microorganisms), or organic and inorganic carbon in soils and strata. Forests can offset carbon emissions from human activities. The amount of carbon a plant can sequester depends a number of variables, including species and age. On average, trees are approximately 25% carbon by weight.

Forestation and deforestation abatement efforts may be one of the most cost-effective means of reducing atmospheric levels of CO_2. Carbon storage estimates have been produced for live trees, understory vegetation, litter and other organic matter on the forest floor, coarse woody debris and soil. These estimates by the U.S. Forest Service and EPA cover 120 years beginning with the regeneration of clear-cut timberland, cropland, or pasture. The sequestration rate is determined as the rate of increase in carbon storage during the lifetime of the trees. An estimate of the accumulation rate for West Virginia has been calculated to be 1.686 lbs/acre/year (EPA, 1993). The terrestrial biosphere is estimated to sequester approximately 2 billion metric ton of carbon per year. Research and development is underway to increase the sequestration rate. There are two fundamental approaches to sequestering carbon in terrestrial ecosystems: 1) protection of ecosystems that store carbon so that sequestration can be maintained or increased; and 2) manipulation of ecosystems to increase carbon sequestration beyond current conditions. [http://www.fe.doe.gov/coal_power/sequestration/index.shtml]

There has been increased interest by the energy industry in establishing a uniform method for calculating and trading carbon sequestration "credits" for tree planting. Carbon sequestration credits are sometimes calculated based on accumulated pounds/acre/year times the acres of forest. Over a 70-year life span, an acre of trees withdraws 500 tons of CO_2 out of the air and turns it into wood, provided the wood never burns or decomposes. One credit could equal one ton of CO_2 removed

from the atmosphere. In Europe, where government-regulated trading is already taking place, a ton of sequestered CO_2 equals $8 (Forbes: March 17, 2003).

Currently, there is no legislation or regulation that provides tangible incentives for carbon sequestration. However, the U.S. tax code provides a tax credit for businesses and individuals to recover a percentage of the amortized cost (e.g., equipment, seed, seedlings, site preparation, labor, etc.) of reforestation of qualified timber properties [Internal Revenue Code, Title 26, Subtitle A, Chapter I, Subchapter A, Part 4, Subpart E, Section 48(b)]. The Energy Policy Act of 1992 [16 U.S.C. 1650(b)] established a program for reporting results of voluntary measures to reduce, avoid or sequester greenhouse gas emissions. As a result, hundreds of U.S. companies annually report almost 2,000 projects to record their efforts to reduce or sequester greenhouse gases. These projects have steadily grown and, in 2001, reported 222 million metric tons of CO_2 equivalent direct reductions, 71 million metric tons of indirect reductions, 8 million metric tons of reductions from carbon sequestration and 15 million metric tons of unspecified reductions [http://www.eia.doe.gov/oiaf/1605/vrrpt/summary/index.html]. U.S. companies continue this voluntary reporting so they may receive actual credits, if and when a formal regulatory basis exists for trading such credits. Many states have or are considering similar incentives for reforestation and carbon sequestration. A formal Federal program establishing carbon sequestration credits could provide additional incentives for reclaiming coal mining sites with trees.

a.3. SMCRA Program

The following features of the SMCRA program address some of the pertinent aspects of a post mining land use including reclamation with trees. OSM regulations specify that applications for a surface coal mining operation must provide a revegetation plan [30 CFR 780.18(b)(5)]. Therefore, if the chosen PMLU involves reforestation, the required revegetation plan designs and describes how the operation intends to meet performance standards. The plan must include, but is not limited to, descriptions of the following items:

- schedule for revegetation;
- species and amounts per acre of seeds and seedlings to be used;
- methods to be used in planting and seeding;
- mulching techniques;
- irrigation, if appropriate, and pest and disease control measures, if any;
- measures proposed to be used to determine the success of revegetation; and,
- a soil testing plan for evaluation of the results of topsoil handling and reclamation procedures related to revegetation.

Topsoils, Subsoils, and Substitutes

If the revegetation plans involve trees, a suitable rooting and growth medium must be placed on the backfilled area following grading. Applicants may propose to salvage native soils or a substitute for native soils with suitable properties for establishing vegetation. If native topsoil is not salvaged, stored, and used as the reclamation growth medium, the proposed plan identifies specific zones within the geologic profile to be selectively recovered and used as topsoil substitute materials. The selection of these materials is primarily based upon the pH of the growth medium being neutral or slightly alkaline (i.e., pH 7.0 or above) in order to minimize potential production of low pH runoff and maximize the successful establishment of ground cover to control erosion. Typically the

substitute material is redistributed to a depth of 6 inches, with all materials beneath the topsoil substitute heavily compacted to maximize stability of the backfill.

Topsoil substitutes--Selected overburden materials may be substituted for (or used as a supplement to) topsoil, if the operator demonstrates to the regulatory authority that the resulting soil medium is equal to or more suitable for sustaining vegetation than the existing topsoil. The resulting soil medium must be the best available in the permit area to support revegetation. Because of typically thin native topsoil in the EIS study area, the majority of surface coal mines propose topsoil substitutes (i.e., in lieu of salvaging, protecting, and redistributing native soils). When topsoil substitution is proposed, the permit application must contain results comparing physical and chemical analyses of the overburden topsoil substitute material with the native topsoil. The results must demonstrate that the resultant topsoil substitute is at least as suitable as the native topsoil for sustaining revegetation. Tests must be certified by an approved laboratory (e.g., U. S. Department of Agriculture, state agriculture agency, university, Tennessee Valley Authority, Bureau of Land Management or U. S. Forest Service published data). Alternatively, the applicant may provide results of physical and chemical analyses, field site trials, or greenhouse tests of the topsoil and overburden substitute materials (soil series) from the permit area. If the applicant demonstrates, through soil survey or other data, that the topsoil and unconsolidated material are insufficient and that substitute materials will be used, only the substitute materials must be analyzed. [30 CFR 816.200(c) further interpreting 30 CFR 816.22(e).]

Native soils--If a revegetation plan for trees requires salvaging, protecting, and redistributing native soils or subsoils within the proposed surface coal mining operation, this plan is achieved through compliance with the SMCRA performance standards for soils handling. To ensure that these soils are available for redistribution on completion of coal extraction, backfilling, and grading, soils must be salvaged before mining and protected during the course of mining. Before any surface disturbance occurs, the mining area is cleared of all vegetative material. At least six inches of topsoil must be removed independent of subsoil material and stockpiled in a designated topsoil storage area, protected from contaminants and unnecessary compaction. To prevent erosion, the stockpile is temporarily revegetated and located so that winds and surface drainage do not blow or wash it away. Subsoils may also be removed and stockpiled, if necessary to achieve the revegetation plan. When mining is completed, but before topsoil and subsoil are distributed on the mined area, the soil is tested to determine if any additional nutrients or soil amendments are needed to ensure an adequate growing medium. The soils are then redistributed over the mined area so that a uniform thickness is achieved, and prepared for seeding or planting. [30 CFR 816.22.]

Revegetation

Successful mine site reclamation to a PMLU including trees requires successful revegetation. The operator is required to establish a vegetative cover on all areas that were disturbed during the mining operation in accordance with the vegetation plan and 30 CFR 816.111-116, paraphrased below. The permanent vegetative cover approved in the plan must conform with the following characteristics:

- diverse, effective and permanent;
- comprised of species native to the area (or of certain introduced species where necessary to achieve the PMLU);
- at least equal in extent of cover to the natural vegetation in the area;
- capable of stabilizing the land surface from erosion;

- compatible with the approved post mining land use;
- same seasonal characteristics of growth as the original vegetation;
- capable of regeneration and plant succession; and,
- compatible with plants and animals in the area.

Revegetation of the mine site must occur during the first normal planting season after the site has been backfilled and topsoil replaced. Once seeding and/or planting of the area has occurred, the area will either be mulched or some other approved soil stabilizing practice used to prevent erosion, unless the regulatory authority determines that erosion will not be a problem. A BMP manual could describe woody species suited to typical mine soils and compatible with succession and terrestrial ecosystems.

Bonding and Success Measurement

Performance bond liability is required for the duration of the surface coal mining and reclamation operation and for a "period of extended responsibility" for successful revegetation. If revegetative success does not occur within this period, the liability remains until SMCRA, regulatory program, and permit reclamation requirements are met. [30 CFR 800.13(a)(1)]

Prior to bond release of the site, success of revegetation will be measured by the regulatory authority. At a minimum, revegetative success standards must consider the following in order to support the approved PMLU:

- For areas developed for fish and wildlife habitat, recreation, shelter belts, or forest products, the success of vegetation is determined on the basis of the densities of tree, shrub and vegetative ground cover.
- Minimum stocking and planting arrangements are specified by the regulatory authority on the basis of local and regional conditions and after consultation with and approval by the state forestry and wildlife agencies. Consultation and approval may occur program wide or on a permit-specific basis.
- Trees and shrubs used to determine the success of stocking and the adequacy of the plant arrangement shall be those with utility for the approved PMLU.
- Trees and shrubs counted in determining vegetative success will be healthy and in place for at least two growing seasons.
- Statistically valid sampling tests must used. Ground cover, production or tree and shrub stocking shall be no less than 90 percent of the approved success standard.
- At the time of bond release, at least 80 percent of the trees and shrubs used to determine vegetative success will have been in place for 60 percent of the bonding period.
- Vegetative ground cover shall not be less than that required to achieve the approved post mining land use.
- For areas that will be remined or otherwise redisturbed by the proposed surface coal mining operation (e.g., areas disturbed by mining before August 3, 1977 and not reclaimed to the SMCRA standards) the minimum vegetative ground cover will be no less than the ground cover existing before redisturbance and adequate to control erosion.

Operators within the EIS study area have a five-year period of extended responsibility for measuring successful revegetation. This liability period begins after the last year of augmented seeding, fertilization or irrigation--excluding husbandry practices that are approved by the regulatory authority. The purpose is to achieve a reasonable degree of certainty that the plantings have taken hold and can remain viable without further human tending. The success of revegetation is a component of the performance bond.

If the regulatory authority determines revegetation success is not achieved, the operator must augment the revegetation. Before the bond can be released, revegetative success measurements must indicate that reclamation meets ground cover requirements or other success standards.

b. Alternatives 1, 2, and 3

Action 13: OSM, in cooperation with the states and research community, would develop guidelines identifying state-of-the-science, best management practices (BMPs) for selecting appropriate growth media, reclamation techniques, revegetation species, and success measurement techniques for accomplishing post mining land uses involving trees.

A compendium of the "best science" in reclamation technology would be extremely useful to permit development, review and on-the-ground improvements. This action would compile and describe proven BMPs for the design and implementation of mining and reclamation activities, including the following:

- maximizing, to the extent economically practicable, commercial recovery of forest products prior to mining;
- selecting appropriate growth medium from available topsoil, weathered subsoil and underlying overburden, or topsoil substitute and development of the best reclamation plan to best support the intended post-mining land use (PMLU) and/or enhance natural succession or re-establishment of native riparian or wildlife habitat;
- reducing soil compaction of the growth medium, particularly where trees are intended;
- utilizing slash and non-harvested forested materials;
- selecting tree and shrub species suitable for erosion control, the final-graded spoil and the approved PMLU;
- creating permit-specific or programmatic standards for measuring the success of tree and shrub stocking, and ground cover;
- maximizing use of available organics and native seed sources to promote natural succession or habitat enhancement; and
- using less competitive herbaceous ground cover to encourage tree growth and control erosion.

Some reclamation planning, design, and implementation topics that could be encompassed by a BMP guidance manual are illustrated below.

b.1. Forest Product Recovery and Organic Utilization

Surface owners and mine permit applicants have an inherent economic incentive to harvest viable timber products prior to initiating mining activities. Maximizing the commercial recovery of forest

products at proposed mine sites could serve to better meet demand for wood products and reduce the need for additional logging-related disturbances. This could minimize adverse impacts to fish, wildlife, and related environmental values. This action would provide BMPs in a guidance document to assist a landowner or permit applicant in maximizing the economic recovery of forest product and utilizing the organic materials remaining after logging to facilitate mine site reclamation. Typical practices for handling these organic materials include burning or burying within the mine site. Redistribution of these organic materials as mulch on the reclaimed mine site could be beneficial to revegetation and enhance wildlife habitat. Windrows at the edge of the mine, or as strategically placed "islands," provide niches for wildlife and/or organic nutrients to the soil and adjacent streams. This approach could accelerate natural succession because these materials may contain seeds and spores from native vegetation.

b.2. Revegetative Success and Growth Media for Forest PMLUs

A BMP manual would include clarification of methods for evaluating revegetation success to demonstrate compliance with 30 CFR 816.116(b)(3)(iii), which requires 80 percent of the trees and shrubs used for reclamation be in place for 60 percent of the bond liability period. This standard is sometimes criticized as not adequately ensuring long-term success for re-establishment of trees. SMCRA agencies would work with forestry experts and the research community to establish improved criteria as part of BMPs to ensure reforestation success for pine and/or hardwood forests. West Virginia worked with leading forestry experts to promulgate regulations that require practices identified in the most current research for salvaging topsoil, weathered subsoil, and overburden; and set target success yields for commercial forestry PMLU. Virginia and Kentucky state guidelines for reforestation also reflect the state-of-the-art in forestry reclamation. Similar criteria could be explained in the BMP manual to ensure long-term success of pine and hardwood commercial forest. The BMPs could describe alternatives for growth media where unmanaged woodlands is the PMLU.

b.3. Natural Succession

Natural succession is a progression from one habitat type to another without human intervention, extending from a disturbed state to a climax community such as mature forest. The BMPs could encourage special reclamation practices for large areas disturbed by surface coal mining. These practices would be designed to accelerate natural succession of native trees. One example of these practices is creating topsoil "islands" on broad reclaimed areas. Such islands would serve to inoculate the sterile spoil with the necessary microbial mass, provide a native seed bank, and reduce the time frames necessary for natural succession to occur by reducing the distances between the remaining seed source (the adjacent undisturbed forestland) and the large open expanses of the disturbed area.

b.4. Technology Transfer and Outreach

This action also recommends continued technology transfer and promotion of OSM reforestation initiatives. Since 1998, OSM and the state SMCRA regulatory authorities have been working with the coal and timber industry, academia, landowners, and other government agencies to promote the economic, environmental, cultural, and aesthetic benefits of growing trees on mined lands. Incentives for re-establishing trees on active or AML lands, such as offsetting "carbon credits," are among the concepts under consideration. As a result of this outreach, several states have developed written guidelines identifying methods to assure success when growing trees as part of the approved

PMLU. This action would endorse the initiative and recognize the need for continued work with all stakeholders through symposia, research, and experimental practices to identify the best techniques for successful reforestation.

Action 14: If legislative authority is established by Congress or the states, then SMCRA regulatory authorities will require reclamation with trees as the post mining land use.

Legislation could change SMCRA or similar state statutes to authorize SMCRA regulatory authorities to require reclamation with trees as the post mining land use. This change may be predicated on the condition that forestry was the prevalent land use prior to mining. Any such legislation might provide for an exception to this requirement when an applicant demonstrates that uses other than forestry would provide greater environmental benefits.

9. Air Quality

Surface mining involves a number of activities that can impact air quality or generate noise. Blasting activities are a particular concern, in that they can produce particulate matter, fumes, and potentially damaging low-frequency noise and pressure waves. Equipment operation in the disturbed areas of mine pits, backfill areas, and haul roads can generate airborne particulate matter. Wind over open areas of mine sites and truck haulage of coal on public roads also produces airborne particulate matter, or "fugitive dust".

Fugitive dust usually refers to the particulate matter that is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include unpaved roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations. The dust-generation process is caused by two basic physical phenomena: 1) pulverization and abrasion of surface materials by application of mechanical force through implements (wheels, blades, etc.); and 2) entrainment of dust particles by the action of turbulent air currents, such as wind erosion of an exposed surface. Fugitive dust can also be caused by re-entrained dust, which is put into the air by vehicles driving over dirt roads (or dirty roads) and dusty areas. The emission rates of fugitive dusts are highly variable and dependent on the prevailing atmospheric conditions, including wind speed and direction.

Applicable statutory provisions are summarized in the human and community programmatic review presented in Appendix B. Performance standards for the protection of air quality are also discussed in Appendix B. A technical study on Mine Dust and Blasting Fumes is in Appendix G and a section titled "The Relationship of Surface Mining and Air Quality" is in Chapter III.V.

The objectives of a previous EPA study were to review available field measurements at surface mines, present a critical review of the available emission factors for surface mining activity, and make recommendations for further studies. The study found that mining activities such as drilling, blasting, removal, haul trucks, material handling and storage, truck loading and unloading, and dozer activities cause dust. Both drilling and blasting emissions are considered to be small contributors to particulate matter emissions, in comparison with other sources of emissions in this category. The most significant sources of emissions for this category of activities are identified as overburden removal and haul trucks. [EPA, 1991.]

A study commissioned for this EIS concluded that dust and fume emissions from blasting pose no potential health problems outside of the mining area. Visible and measurable fugitive dust rarely migrated more than 1,000 feet from the actual blast [Chapter III.V.2 and Appendix G].

a. No Action Alternative: The Regulatory Program Today

The Clean Air Act (CAA) controls air quality issues through the EPA and state implementation of the CAA and related state statutes. Air emissions associated with surface coal mining operations, such as fugitive dust, can be regulated under the State Implementation Plans (SIPs), state permitting programs, and select Federal and state regulations, depending upon the facility composition.

The CWA deals with air quality in NEPA compliance reviews. In addition, the COE must a analyze whether emissions of a criteria pollutant, attributable to a proposed permit for an action in either a nontattainment or a maintenance area, are consistent with the applicable SIP. If the COE determines that the total of direct and indirect emissions from the activities proposed under a permit will not exceed de minimis levels of direct emissions of a criteria pollutant or its precursors, then the activity is not subject to general conformity requirements [40 CFR Part 93.153].

SMCRA, at 30 U.S.C. 1265(b)(4), provides that "...all surface coal mining and reclamation operations must stabilize and protect all surface areas...to effectively control erosion and attendant air and water pollution."

a.1. Clean Air Act

The 1990 CAA is a Federal law covering the entire country. EPA establishes air quality criteria from a compilation of the latest scientific knowledge on the kind and extent of identifiable effects on public health and welfare expected from specific air pollutants for area, stationary, and mobile sources. Primary National Ambient Air Quality Standards (NAAQS) are promulgated, specifying the levels of air quality for each criteria pollutant required to protect public health and the environment. The goal of the CAA was to set and achieve NAAQS in every state by 1975. The CAA was amended in 1977, primarily to set new goals for achieving attainment of NAAQS, since many areas of the country had failed to meet the deadlines. The 1990 amendments to the CAA, in large part, were intended to meet unaddressed or insufficiently addressed problems such as acid rain, ground-level ozone, stratospheric ozone depletion, and air toxics. Secondary NAAQS are also promulgated to protect the public welfare from any known or anticipated adverse effects.

EPA and the states are responsible for CAA implementation regarding air quality. Under the CAA, states are required to develop State Implementation Plans (SIP) applicable to appropriate industrial sources in the state . The SIP should explain how each state will perform activities to comply attain, maintain and enforce each primary and secondary NAAQS. The SIP generally consists of a collection of regulations which the state will use to enforce the CAA. Each SIP is submitted to the EPA for approval and, once approved, becomes Federally enforceable. SIPs vary between states. Besides the development of source specific regulations, the SIPs were also required to contain a permitting program for major and minor sources [42 U.S.C. 7410].

Air emissions associated with mining operations (such as blasting, earth and rock removal, transport-related dust) are considered "fugitive emissions" under the CAA and its accompanying regulations. These emissions can be regulated under the state SIPs, state permitting programs, and

select federal and state regulations, depending upon the facility composition. The Federal government generally does not have the authority to regulate fugitive emissions which are not associated with a *permanent stationary source* [42 U.S.C. 7479]. Mountaintop mines are not permanent stationary sources; and, thus far, have not been considered to meet the criteria for *major source* air quality permits, i.e., defined for particulate matter as sources which emit at least 250 tons/year [42 U.S.C. 7661]. There are 42 state installed and operated air monitoring stations located in the EIS study area. Except for ozone, monitoring stations in the study area reported acceptable air quality for all criteria air pollutants in recent years. Stations monitoring ozone concentrations in Boyd and Greenup Counties (KY) reported multiple years where levels of ozone exceeded national ambient air quality standards. [http://www.epa.gov/air/data/]

States, do not typically issue air permits to mountaintop mining operations, nor do they currently require best management practices under CAA--although SMCRA indicates mining permits may contain control practices for some fugitive emissions. In practice, the state regulation of surface mining sources of fugitive dust is usually the responsibility of the state mining offices rather than the state air quality programs.

EPA, to protect human health, has established air quality standards for smaller-sized particulate matter (e.g., dust and other forms of particulate air pollution). There are two NAAQS for dust. One standard applies to particulate matter sized at 10 microns in diameter or smaller (PM-10). In 1997, EPA also promulgated a NAAQS for particulate matter sized at 2.5 microns or smaller (PM-2.5). The PM-10 and PM-2.5 NAAQS pertain to all dusts that fit the aerodynamic diameter requirements. This includes the fugitive emissions which may contain crystalline silica. The NAAQS does not include specific limits on silica itself. Most fugitive dust particles from surface mining operations generally exceed 10 microns.

a.2. SMCRA

SMCRA regulations provide controls for blasting, fill stability, revegetation, flooding, fugitive dust, and alternative post mining land uses in permit application review and approval and in mining and reclamation inspection and enforcement activities. SMCRA requires that the applicant comply with applicable air and water quality regulations as well as applicable health and safety standards. [30 U.S.C. 1258(a).] Generally, the OSM role in controlling air pollution is limited to pollution attendant to erosion [NWF v. Hodel, C.A. 84-5743 (U.S. Court of Appeals D.C. Circuit, January 29, 1988)]. The appeals court found that EPA has the authority under the CAA to regulate fugitive dust from surface mining operations. SMCRA performance standards require all exposed areas of surface coal mining operations to be protected and stabilized to effectively control erosion and air pollution attendant to erosion. This is usually accomplished through the application of mulch to reclaimed areas after backfilling and regrading, and the watering of unpaved haul roads [30 CFR 816.95].

b. Alternatives 1, 2, and 3

Action 15: Evaluate and coordinate current programs for controlling fugitive dust and blasting fumes from MTM/VF operations, and develop BMPs and/or additional regulatory controls to minimize adverse effects, as appropriate.

Under this action, EPA, OSM, state air quality agencies, and state mining agencies would identify the following:

- meteorological and physical conditions which can exacerbate dust or blasting fumes;
- state-of-the-art techniques currently used in the mining industry to control dust and fumes; and
- appropriate regulatory improvements to qualitatively assess and control emissions.

Coordination between these offices under this action would ensure that best management practices are implemented to minimize fugitive particulate matter which may contribute to statutory air pollution.

10. Flooding

The central Appalachian physiographic region is a highly-dissected plateau characterized by high, tree-covered hills and deep, narrow valleys. Large watersheds often feed streams with narrow valleys and small flood plains. In such rugged terrain, people live near or adjacent to the streams and rivers, which may flood during large rainfall events.

As with all types of surface mining, MTM/VF mining and reclamation alter the topography and drainage patterns. Mining also results in changes to the infiltration capacity of the ground, runoff variables associated with soil/ground cover complexes, and transpiration rates associated with the dominant vegetation. Surface coal mining involves the alteration of normal watershed flow paths by installation of roads, diversions, sediment retention basins, and large mining pits. These flow path modifications can change the travel time from pre-mining and provide runoff retention that can reduce peak flows downstream. The combination of these alterations can impact the amount of runoff from the mined area for a given storm event.

The agencies commissioned two flooding studies by the USGS, entitled "Comparison of Storm Hydrographs in a Small Valley-filled and Unmined Watershed, 1999-2001, Ballard Fork, West Virginia" and "Comparisons of Peak Discharges Among Sites with and without Valley Fills for the July 8-9, 2001 Flood in the Headwaters of Clear Fork, Coal River Basin, Mountaintop Coal-Mining Region Southern West Virginia." The USGS study of the July 2001 flood, based on reconstructive modeling, found that the peak discharge from the flood in paired watersheds with a recurrence interval of 10 years was less in a watershed with a reclaimed valley fill than in an unmined area. However, peak discharges from storms exceeding 25 year recurrence intervals in two other paired watersheds were greater in two watersheds with reclaimed valley fills than in two unmined watersheds. The USGS Ballard Fork study found that runoff from mined watersheds exceeded runoff from unmined watersheds when rainfall was greater than 1 inch per hour. The report also states that valley fills tend to store considerable runoff and release the storm water more slowly than watersheds without fills.

The COE and OSM completed a flood modeling study of the impacts of rainfall events on three individual valley fills, as well as the cumulative impacts of two fills on downstream flows. This modeling study used computer simulations to predict storms' peak discharges for several precipitation events during pre- and post mining scenarios. Modeling simulated different ground cover conditions (e.g., grassland versus tree cover) and different mine site reclamation (planned versus AOC+). Peak runoff was greater for AOC+ reclamation than for the company's planned configuration; runoff was less for forested cover than for grass. The models also calculated that the post mining peak flows would be higher than the pre-mining peak flows for the same storm events

for all scenarios run. However, the predicted increases in peak flow did not cause flows to leave the banks of the stream channel.

The Governor of West Virginia commissioned a task force to study severe flooding in southern West Virginia in 2001 and 2002. The task force directed a state technical team to prepare a report, "Runoff Analysis of Seng, Scrabble, and Sycamore Creeks," completed in June, 2002. A Kentucky study, "Joint OSM-DSMRE Special Study Report On Drainage Control" was completed in December, 1999. The studies were designed to determine whether mining caused increases in peak flow downstream from the mine sites; and if so, the extent to which peak flows were increased. The West Virginia study also evaluated the impacts of logging on peak flows. In general, these two studies concluded that mining does influence the degree of runoff, but that the extent to which a change in runoff may have actually caused or contributed to flooding were site-specific. Site-specific factors may include topographic influences, stream channel conditions, distance downstream from the mine site, man-made channel restrictions, etc. The West Virginia study recommended flood potential analysis for every permit.

An OSM review of citizen complaints and oversight studies in the EIS study area found that flooding was caused by mine sites that were not following or maintaining their approved drainage control plans. Studies prepared as part of this EIS and other available literature indicate that peak runoff increase or decreases below mining can occur. Site-specific analysis is required, based on many factors, including ground cover, site configuration, permanent or temporary drainage controls (diversions, sediment ditches or ponds, mining pits, or depressions), infiltration rates, percent disturbance, etc. A copy of these studies may be found in Appendix H. A discussion of the relationship of MTM/VF to surface runoff quantity and flooding is in Chapter III.G.

a. No Action Alternative: The Regulatory Program Today

Evaluating the potential for flooding is an important component in the decision to grant or deny SMCRA and CWA Section 404 permits, especially where the risk of flooding could adversely affect people downstream from the mining activity. Both OSM, SMCRA regulatory authorities, and the COE must address flooding in their permit considerations. In addition, Presidential Executive Order 11988, "Floodplain Management" requires Federal agencies to identify all actions involving construction in floodplains and provide for public review of such actions.

a.1. CWA

The COE is required to consider flood hazards and floodplain values in its public interest review [33 CFR 325(c)(1)]. The regulations state: "Although a particular alteration to a floodplain may constitute a minor change, the cumulative impact of such changes may result in a significant degradation of floodplain values and function and in increased potential for harm to upstream and downstream activities. In accordance with the requirements of Executive Order 11998, District Engineers, as a part of their public interest review, should avoid to the extent practicable, long- and short-term significant adverse impacts associated with the occupancy and modification of floodplains, as well as the direct and indirect support of floodplain development whenever there is a practicable alternative. For those activities which in the public interest must occur in or impact upon floodplains, the DE shall ensure, to the maximum extent practicable, that the impacts of potential flooding on human health, safety and welfare are minimized, the risks of flood losses are

minimized, and whenever practicable the natural and beneficial values served by floodplains are restored and preserved." [33 CFR 320.4(k)(2).]

There are many engineering and hydrologic/hydraulic models, equations, and procedures for assessing peak runoff and the choice of an appropriate model is dependent on factors such as geology, hydrology, topography and precipitation. Recognizing the choice of model is dependent on site-specific factors, a standardized methodology addressing flooding has not been identified by the COE Regulatory Branch as nationally applicable for CWA Section 404 applicants. The Huntington District of the COE has chosen to require applicants to evaluate the effects of a 100-year storm during "worst-case" conditions when mining and reclamation operations disturb the largest portion of permit area.

a.2. SMCRA

PHCs and CHIAs

The Federal regulations at 30 CFR 780.21(f) require the surface mining applicant to do detailed analyses of the impact of the proposed mining activity on hydrology within the permit and adjacent areas. Among other things, the applicant is required to furnish an analysis of flooding or stream flow alteration. The existing regulations do not specify the manner in which the permit applicant must perform the flood analysis. The methods required or used are left to the discretion of the individual regulatory authority or the applicant. SMCRA regulatory authorities have not typically specified a particular methodology for flooding evaluation because the engineering tools for analysis are varied due to applicability to differing site-specific conditions. Many applicants perform the requisite sediment control design and address the results of this 25-year storm design on downstream conditions. Other areas of the mine site may have diversions based on a 100-year storm. OSM published a hydrologic guidance document containing a section "Estimating Hydrologic Impacts," illustrating the wide variety of hydrologic analysis techniques that could satisfy the SMCRA requirement for determining the PHC, surface water quantity analysis, and CHIA. For a detailed description of PHCs, CHIAs, and the guidance document see Chapter II.C.7.b.

Surface-Water Quantity

Stream peak discharges at a particular site consist of ground water derived base flow and surface runoff resulting from precipitation or snow melt. Seasonal flow conditions refer to the fluctuation of flow over the course of a year. Low flow refers to the minimum discharges during the year that are wholly composed of base flow. For ephemeral streams, there is no base flow component; flows occur only in response to precipitation and snow melt runoff.

Surface-water discharge parameters most often included in hydrologic analyses are peak and low-flow frequencies and mean flow values. Although seasonal flow conditions generally do not include storm event peak flows, the PHC determination should indicate the impact of the proposed operation on flooding or stream flow alteration. Therefore, some analysis of storm event peak flows may be necessary for flooding evaluation. Peak flows and flooding may be reduced during mining due to the increased infiltration capacity of the reclaimed area and the storage capacity of water-retention structures. The level of detail and analytical method accepted by a particular state for PHCs is highly variable and may differ based on the sensitivity of environmental resources and site-specific hydrologic and geologic conditions.

Kentucky, Virginia, and West Virginia surface mining regulatory programs contain essentially the same requirements as OSM regulations. Like the PHC regulations, the CHIA regulations do not specify a standard method for analyzing cumulative effects, and the method of analysis is left to the regulatory authorities discretion. OSM is conducting flooding risk assessments as part of SMCRA regulatory oversight in the Appalachian region.

WVDEP has developed the Surface Water Runoff Analysis (SWRA) guidelines to evaluate mining proposals as they relate to flooding potential. Under these guidelines, WVDEP requires the applicant to demonstrate that mining and reclamation will not increase surface water runoff peaks during storm events over pre-mining conditions. In several instances, mining proposals were altered to take measures consistent with the guidelines so that modeled predictions result in no increase in peak runoff.

b. Alternatives 1, 2, and 3

Action 16: OSM, SMCRA state regulatory authorities, and the COE would develop guidelines for calculating peak discharges for design precipitation events and evaluating flooding risk. In addition, the guidelines would recommend engineering techniques useful in minimizing the risk of flooding.

It is difficult to generalize mining impacts on runoff. Due to site conditions, increases in peak runoff may not cause or contribute to flooding. Flooding results when stream banks overflow and cause hazards to persons or damage to property, roads, etc (i.e., increased peaks contained within a stream channel would not be considered flooding). This action is proposed with the objective of bringing consistency to the flooding potential analysis by applicants to satisfy both SMCRA and CWA Section 404 requirements.

This action involves OSM, state SMCRA agencies and COE, working with academia and other appropriate agencies, to identify acceptable methodologies for calculating peak discharges and evaluating downstream flooding risk. Modeling and other recommended approaches for peak runoff determinations could be discussed and the proper design storm event for evaluation could be suggested. The guidelines could address the following:

- hydrologic and hydraulic parameters considered in these computations or models (e.g., infiltration rates for spoil, runoff curve numbers or coefficients for disturbed and reclaimed lands, design storm types, antecedent moisture conditions, etc.);
- site conditions analyzed for peak discharge and downstream flooding risk, and establish flooding threshold criteria (e.g., the risk of flooding to structures such as homes, businesses, roads, utilities, etc); and
- efforts (e.g., states, COE, USGS) for considering surface water runoff analysis in an assessment of flooding risks for CWA and SMCRA purposes.

Development of a generally accepted approach to make this assessment could make the permit evaluation more efficient and be included in the MOA [Chapter II.C.1].

11. Threatened and Endangered Species

Mountaintop mining and valley fills could affect federally-listed endangered and threatened endangered (T&E) species or destroy or adversely modify critical habitat. The agencies recognize

that ESA compliance is required to facilitate conservation of these valuable resources. [Note: the obligation of the SMCRA authorities under the ESA is discussed in the preamble to the Federal Register 52 FR 4354, December 11, 1987.]

The ESA was passed in 1973 to conserve "the ecosystems upon which T&E species depend" and to conserve and recover listed species [16 U.S.C. 1531, *et seq*.]. Under the law, species may be listed as either "endangered" or "threatened" [50 CFR Part 17]. Endangered means a species is in danger of extinction throughout all or a significant portion of its range. Threatened means a species is likely to become endangered within the foreseeable future. The law is administered by the FWS.

Under Section 7 [16 U.S.C. 1538] of the ESA, any Federal agency proposing to undertake an action must review to determine if the action may affect T&E species or their critical habitat and if so, consult with the FWS. Federally listed threatened, endangered, and candidate species known to inhabit the EIS study area, as well as state species of concern, were identified through correspondence with the appropriate Kentucky, Tennessee, Virginia, and West Virginia state agencies, plus FWS field offices with jurisdiction over federally listed species in the four states.

This EIS is providing new information on the extent to which MTM/VF may affect listed species and changes to existing SMCRA and CWA programs are being considered. As a result, the Federal agencies are conducting an informal consultation with FWS to determine what effect the proposed action may have on the Federally listed species or critical habitats in the study area. EPA volunteered to lead the consultation process on behalf of all of the EIS agencies and is in the process of writing a Biological Assessment (BA) that would identify any T&E species likely to be adversely affected by the proposed action. The preliminary findings of this effort indicate that several of the listed species cited in Appendix F are present in the EIS study area and may be affected by MTM/VF to an extent not previously considered, and any such effects may be changed by proposed programmatic actions. Measures to avoid adversely affecting the listed species would be considered in the BA. Information about the findings of the BA and the informal consultation would be provided in the final EIS.

Since T&E species or their critical habitats may be affected in the impact area, the ESA requires consultation or coordination in assessment of the preferred alternative. If the ESA assessment concludes that the preferred alternative would not likely adversely affect T&E species or critical habitat and the FWS concurs, no further action is required. If after review of the BA, the FWS cannot concur in this finding, formal consultation under ESA Section 7 is required.

a. No Action Alternative: The Regulatory Program Today

The ESA requires Federal agencies to consult with the FWS to ensure that the actions they authorize, fund, or carry out will not jeopardize T&E species. The Federal agency makes the initial determination of whether a proposed action may affect T&E species. The Federal agency may choose to enter into informal consultation with the FWS or enter directly into formal consultation. If the Federal agency determines during informal consultation that the action or the action as modified is not likely to adversely affect T&E species or critical habitat and FWS concurs in writing, then the consultation process is terminated.

If the Federal agency determines that the action is likely to adversely affect T&E species, it initiates formal consultation with the FWS. The FWS then prepares a Biological Opinion (BO), which will determine whether the action will or will not jeopardize T&E species or adversely modify critical habitat; identify the nature and extent of the effects of the action on listed species and critical habitat; determine the amount or extent of anticipated incidental take of listed species; and provide mandatory reasonable and prudent measures to minimize the impacts of incidental take to the listed species. In the relatively few cases where the FWS concludes at the end of a BO that the proposed action will jeopardize threatened and/or endangered species, the FWS must issue reasonable and prudent alternatives about how the proposed action could be modified to avoid jeopardy to T&E species or adverse modification to critical habitat [50 CFR 402]. Although candidate species receive no statutory protection under ESA, Federal agencies are encouraged to form partnerships to conserve these species because they are by definition, species that may warrant future protection under ESA [16 U.S.C. 1535].

In the case of CWA Section 404 authorization for valley fills, ESA consultation occurs between the COE and FWS. The consultation process is the same for general permits and IPs. Neither general nor IPs may authorize activities that would jeopardize the continued existence of a T&E species or destroy or adversely modify the critical habitat of such species [33 CFR 330.4(f)]. General Condition 11 of all NWPs requires that applicants notify the COE if any listed species or designated critical habitat might be affected or is in the vicinity of the proposed work, or if the proposed work is located in designated critical habitat; requires that the permittee not begin work on the activity until notified by the COE that the requirements of the ESA have been satisfied and that the activity is authorized by NWP; and states that the NWP does not authorize the taking of any T&E species.

In the case of SMCRA authorization for surface coal mining operations, FWS and OSM completed ESA consultations during the development of SMCRA regulations and at the time of OSM delegation of state SMCRA programs in the late 1970s and early 1980s. In 1994, because additional T&E species had been listed, and the provision of incidental take did not exist at the time, OSM and FWS reinitiated consultation. The consultation resulted in a BO issued by FWS in 1996. The 1996 BO stated that there is no jeopardy to T&E species if mining is conducted under a properly-implemented SMCRA regulatory program (i.e., OSM Federal or state-delegated programs). The BO also emphasized the use of species-specific measures in individual mining permits to minimize potential take of T&E species or adverse modification of critical habitat.

The conclusions reached by the FWS in the 1996 BO were based, in part, on assumed compliance with the regulatory requirements of SMCRA pertaining to the protection of fish and wildlife and related environmental values [including, but not limited to 30 CFR 772.12, 773.12, 773.13, 774.13, 774.15, 780.16, 784.12, 815.15, 816.97, and 817.97]. In addition, to ensure that the impacts of incidental take [see definition of "take" and related term "harm" in 16 U.S.C 1534 and 50 CFR 17, respectively] of listed T&E species would be minimized, and to exempt SMCRA state and Federal regulatory authorities from the prohibitions of Section 9 of the ESA, the FWS BO contained terms and conditions that set forth certain procedural requirements for T&E species. These included requirements that the regulatory authority would: 1) work with FWS to develop species-specific measures to minimize anticipated incidental take; 2) whenever possible, quantify take resulting from activities carried out under SMCRA; and 3) provide FWS with a written explanation whenever the authority decides not to implement species-specific measures recommended by FWS, and seek higher level review when concurrence between FWS and the authority cannot be reached. The BO provides that the SMCRA regulatory authorities [pursuant to 30 CFR 774.11or its state counterpart]

would require reasonable revision of a permit, when necessary, at any time to ensure compliance with the ESA.

In 1998, FWS and OSM agreed that more specific guidance was needed to fully implement the 1996 BO. In 2002, FWS and OSM developed a training course to clarify agency authorities and applicant responsibilities, and to streamline coordination between the SMCRA regulatory authority and FWS. This training course is designed to inform state and Federal agencies about the requirements of the ESA and the 1996 BO, and foster a cooperative working relationship. Improved coordination should enhance listed species protection.

a.1. Migratory Birds

In addition to consultation under the ESA, Federal agencies must coordinate with FWS under other processes such as Executive Orders (EO). Some migratory birds are listed T&E species, however all migratory birds are subject to EO 13186. The President signed EO 13186 on January 10, 2001, directing Federal agencies to conserve migratory birds [http://migratorybirds.fws.gov]. This EO directs each Federal agency taking actions having or likely to have a negative impact on migratory bird populations to work with the FWS to develop an agreement to conserve those birds. The protocols developed by the consultation are intended to guide future agency regulatory actions and policy decisions; renewal of permits, contracts or other agreements; and the creation of or revisions to land management plans. Agencies are expected to take reasonable steps that include restoring and enhancing habitat, preventing or abating pollution affecting birds, and incorporating migratory bird conservation into agency planning processes whenever possible. By January 2003, Federal agencies were to have developed and implemented a Memorandum of Understanding (MOU) with FWS for the conservation of migratory bird populations. As of publication of this EIS, MOUs with the Federal EIS agencies are still in draft form. Because the EO does not apply to actions delegated to states, it has limited applicability in SMCRA permitting actions in all of the study area except Tennessee. Provisions of the COE and EPA MOUs implementing this EO would apply to the study area.

b. Alternatives 1, 2, and 3

Action 17: Based on the outcome of ongoing informal consultation, FWS, EPA, COE, OSM and their state counterparts would identify and implement program changes, as necessary and appropriate, to ensure that MTM/VF is carried out in full compliance with the Endangered Species Act.

To assure compliance with the ESA, this action envisions development of species-specific procedures and protective measures to minimize adverse effects for listed species that occur in the steep slope mining region. These actions would include survey protocols, monitoring requirements (e.g., water quality and quantity), protective restrictions (e.g., buffer zones, seasonal restrictions), and prohibitions (e.g., operations that would jeopardize the species). The species-specific procedures and protective measures can be used to develop area-wide plans that would assist mining companies in preparing their mining plans. For example, baseline information on species presence, standardized protective measures, and monitoring of potential cumulative impacts can be developed on a regional or watershed scale that would assist reviews of individual projects.

D. ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD IN THIS EIS

In addition to the alternatives in Chapter II.C, the agencies assessed several other sets of alternatives for this EIS. Inasmuch as valley fill size affects mine feasibility and environmental impacts, several alternatives considered approaches for restricting the size of valley fills in waters of the U.S. One set of alternatives [Chapter II.D.1.a] limited valley fill sizes based on the type of stream segment filled (ephemeral, intermittent or perennial), while another set restricted fill size based on the watershed size (35, 75, 150, 250 acres) that could be filled [Chapter II.D.1.b]. Another set of alternatives considered would use the proposed fill size to determine which applications must initially undergo IP review versus NWP 21 authorization [Chapter II.D.1.c]. This set of alternatives was based on past mining practices and COE regulatory branch workload management.

Several sets of alternatives were based on protecting particularly high value stream qualities using features of the CWA program, such as "advanced identification," "advanced veto," designating "special aquatic sites," or an outright prohibition of fills in waters of the U.S. based on interpretation of the CWA "anti-degradation" policy [Chapter II.D.2 and II.D.3]. Other alternatives evaluated used cumulative impact measures to limit the size, location, and number of valley fills in a given cumulative impact area [Chapter II.D.1d].

1. Restricting Individual Valley Fills

Two studies performed in conjunction with the EIS confirm that mining viability is directly related to available fill size and that very small fills preclude mining substantial coal resources [Appendix G: Mine Tech Team and Economics Studies]. However, because of direct stream impacts from different fill sizes, regulatory mechanisms were considered for restricting fill sizes to reduce direct impacts. Various alternatives included fill sizes constrained by ephemeral, intermittent, and perennial stream segments; as well as fill sizes limited by the watershed acreage above the valley fill. In addition, a number of alternatives related to cumulative impacts from MTM/VF were considered.

a. Limiting Individual Valley Fill Sizes by Type of Stream Segments

The CWA and SMCRA regulatory programs recognize stream classifications defined by flow characteristics, including ephemeral, intermittent, and perennial segments [30 CFR 701.5 for SMCRA; NWP renewal at 67 FR 2094 implementing 33 CFR 330]. The identification of stream segments was included in the NWP program because of limitations set on the length of stream impacted under certain NWPs are based on whether the segment impacted is ephemeral, intermittent or perennial. The definition of stream segment types and methodologies to locate them are discussed in Chapter II.C.2. The stream segment alternatives considered the following:

- Restricting fills to ephemeral stream segments;
- Restricting fills to intermittent and ephemeral stream segments; and
- Allowing fills in ephemeral, intermittent, and perennial stream segments.

These alternatives were based on the concept that fills confined to stream segments in the upper reaches of watersheds would likely have less adverse aquatic impacts than fills placed lower in the

watersheds. This presumed that the aquatic ecosystem where flow only occurs in response to rainfall or where stream base flow may not persist year round is not as well-established as the aquatic ecosystem farther down the watershed where there is a greater stream base flow.

From a ecological standpoint, however, some stream segments in the upper reaches of watersheds can be important aquatic habitats. Restricting fills to the uppermost stream segments does not recognize the importance of some upper stream segments as ecologically established aquatic habitats. Because existing data do not establish a scientific basis for categorically limiting fills to specific stream segments, this EIS proposes to continue individual, site-specific data collection and study to evaluate the ecological importance of upper stream reaches.

The CWA Section 404 program is jointly administered by the COE and EPA. Use of this program to limit valley fill placement within certain stream segments was considered to implement this set of alternatives. However, the COE cannot prohibit fills in advance of an application. Instead of general prohibitions using stream segments, the COE uses the CWA Section 404(b)(1) Guidelines to approve or deny fills in waters of the U.S. [Chapter II.C.1.a.1]. Precluding valley fills in geographically defined waters of the U.S. may be determined by EPA using specific criteria in CWA Section 404(c) [Chapters II.C.1.a.1 and II.D.3.c.]. Continued data collection would be used by the COE to determine the feasibility of establishing cumulative and individual impact thresholds restricting valley fills based on stream segment, watershed size, quality of the aquatic resource or other characteristics [Chapters II.C.6 and II.C.7].

Use of the OSM SBZ rule was considered to implement the alternatives establishing valley fill restrictions for certain stream segments [30 CFR 816/817.57]. The existing SBZ rule provides that no land within 100 feet of a perennial or intermittent stream be disturbed by surface mining activities unless the SMCRA regulatory authority specifically allows mining activities closer to, or through, such a stream. The specific conditions under which the SMCRA authority may allow such activity and other aspects of the SBZ zone rule are discussed in Chapter II.C.3.a.2. In order for a revised SBZ rule to prohibit fills in stream segments, it would be necessary to identify where stream segments begin and end.

SMCRA Section 702(a) indicates that nothing in SMCRA shall be construed as superceding, amending, modifying, or repealing the CWA [30 U.S.C. 1292(a)(2)]. That is, OSM cannot establish requirements for activities affecting waters of the U.S. that would be inconsistent with existing CWA requirements allowing valley fills. However, OSM may establish regulatory standards on matters where the CWA is silent, but where the CWA program contains existing standards, OSM must defer to the CWA program to ensure nationwide consistency [In re Surface Mining Regulation Litigation America Mining Congress et al., 452 F.Supp. 327, (D.D.C. 1978); 627 F.2d 1346 (D.C.Cir. 1980)]. The CWA Section 404 program regulates aquatic impacts from valley fills in waters of the U.S. and OSM cannot apply the SBZ rule in a way that would supercede or modify the CWA program standards. To do so would not only violate SMCRA Section 702, but would also be inconsistent with SMCRA Section 515(b)(22) where Congress acknowledged the necessity of valley fill construction in streams [30 U.S.C. 1265(b)(22)].

b. Limiting Individual Valley Fill Sizes by Watershed Size

A set of alternatives considered restricting valley fills to certain watershed sizes. These alternatives would have established watershed sizes as a surrogate for stream segments (i.e., ephemeral,

intermittent, perennial flow). The rationale was that smaller fills confined to smaller watersheds would generally have less aquatic impacts than larger fills placed in larger watersheds. The agencies considered implementing the watershed restrictions under the CWA program, with subsequent revision of the OSM stream buffer zone rule to assure consistency.

This set of alternatives was explored in consideration of: 1) the USGS field study of the median watershed sizes for 33 ephemeral and 37 intermittent/perennial stream segments in West Virginia; and 2) preliminary information from economic studies designed to assess the impact of coal recovery and production from restricting valley fills to different size watersheds (35-, 75-, 150-, and 250-acre watersheds, and unconstrained by watershed size). These limited data indicated that the ephemeral and intermittent stream segments are located in various size drainage areas, but very likely to occur in watersheds ranging from 0-75 acres. The field data indicated that watershed sizes for the beginning of perennial stream segments are also variable, but generally expected in watersheds from 75-250 acres.

The preliminary economic studies suggested more significant impacts to full coal resource recovery and production in West Virginia when fills were restricted to watersheds below 75 acres. The economic studies did not show as significant an impact on coal resource recovery and production in West Virginia when fills were restricted to 250- or 150-acre watersheds (i.e., as compared to the unconstrained fill scenario).

This set of alternatives was rejected, in part, because the stream segment information was only collected in West Virginia on a limited number of tributaries and may not be representative nor statistically valid basis for a watershed size surrogate. Also, the economic study results were subsequently determined to have limitations and not suited for establishing alternatives as detailed in Appendix G. Finally, the environmental studies performed for this EIS did not produce data sufficient to provide a suitable basis for differentiating the indirect effects from MTM/VF and other disturbances, as described in more detail below, discussed in Chapter II.C.4, and presented in summaries and study results in Appendix D. This EIS proposes to continue data collection and analysis to determine if scientifically-valid causal relationships can be identified. Continued data collection would be used to determine the feasibility of establishing cumulative and individual impact thresholds restricting valley fills based on stream segment, watershed size, quality of the aquatic resource or other characteristics [Chapters II.C.4, II.C.6 and II.C.7].

c. Watershed Fill Restrictions Based on Past Mining Practice and COE Workload Management

Another set of alternatives considered establishing "minimal impact" thresholds based on watershed sizes, below which CWA Section 404 applications could be processed using NWP 21. A basis for this alternative set was selection of watershed sizes that encompassed the majority of past mining activities. This alternative concept would operate under an approach similar to the existing NWP 21. That is, since MTM/VF proposals undergo SMCRA review, and since sufficient mitigation would be required under the NWP 21 to offset unavoidable impacts, the NWP 21 process would be an appropriate vehicle for authorizing fills within a certain watershed size. The NWP permit process is founded on the principle that those activities (individually and cumulatively) with no more than minimal impact should be processed with a more streamlined COE review. The NWP program also assists the COE in cost-effective, timely processing of applications to avoid permitting backlogs.

The Valley Fill Inventory evaluated the watershed size in the EIS study area for the period 1985-2001 [Chapter II.K.2-5 and Table II.D-1, below]. The inventory included the following: 1) fills constructed in the EIS study area through 1999; and 2) updated for 1999-2001 to include fills either constructed or approved in the study area. Ninety-seven percent (6494 of 6698 fills) of valley fills in the inventory were in watersheds below 250 acres. Almost 76% of the fills in the inventory were in watersheds less than 75 acres (5071 of 6698 fills). Three percent (204 of 6698 fills) exceeded 250-acre watersheds.

This set of alternatives, based on the fill inventory statistics, considered using the 75- and 250-acre watershed sizes as possible thresholds for processing NWP 21 applications. An additional rationale for these alternatives was that the 250-acre watershed size generally approximates the point at which more important aquatic resources are present. The USGS survey of 33-37 stream segments conducted for this EIS indicated that watersheds much smaller than 250-acres could include perennial flows. The 75-acre threshold was another watershed limit alternative considered based on the fill inventory. Under such a 75-acre threshold, if in place since 1985, around 1700 valley fill proposals would have required IP processing; use of the 250-acre threshold during the same time frame would have required just over 200 IPs.

Table II.D-1
Valley Fill Watershed Sizes (1985-2001)

Year	Kentucky			Tennessee			Virginia			West Virginia		
	< 75 acre	75-250 acre	> 250-acre	< 75 acre	75-250 acre	> 250-acre	< 75 acre	75-250 acre	> 250-acre	< 75 acre	75-250 acre	> 250-acre
1985	519	52	7	1	1	0	13	4	1	76	44	11
1986	378	38	5	2	2	0	21	6	2	24	14	4
1987	432	72	5	8	0	0	25	2	0	30	3	0
1988	289	73	14	4	2	0	25	8	1	65	22	2
1989	275	42	5	1	0	0	19	6	2	91	33	5
1990	216	41	6	1	0	0	27	8	1	27	15	3
1991	308	55	7	4	1	0	45	9	2	33	20	5
1992	262	76	8	4	1	0	20	8	1	69	25	5
1993	253	55	6	0	0	0	14	7	5	25	24	4
1994	138	49	6	0	0	0	30	4	1	28	20	6
1995	165	64	4	0	0	0	16	11	0	47	35	10
1996	193	63	7	0	1	0	10	12	1	216	32	6
1997	136	56	6	1	1	0	25	7	0	51	42	4
1998	116	47	7	6	0	0	18	15	0	4	8	7
1999	104	47	6	10	1	1	17	8	1	19	7	1
2000	972	34	2	2	0	0	17	14	4	15	23	0
2001	121	22	1	0	0	0	2	5	0	51	26	0
Total	**4002**	**886**	**108**	**44**	**10**	**1**	**344**	**134**	**22**	**681**	**393**	**73**

The *Bragg* settlement agreement contained a general 250-acre minimal impact threshold for CWA Section 404 NWP 21 processing of MTM/VF proposals in West Virginia. In complying with the *Bragg* settlement terms, the COE retained discretion (based on site-specific aquatic conditions) to require the IP process for fills in watersheds less than 250 acres; or, to process fills in watersheds more than 250 acres under the NWP 21. The COE also evaluates whether multiple valley fills on a project, or multiple mining proposals in a particular watershed, exceed the minimal impact threshold and thus require an IP review. Since the December 1998 *Bragg* settlement agreement fills in watersheds less than 250 acres have mostly been authorized by NWP 21 in West Virginia. Between March 1999 and February 2002 in West Virginia, there have been 5 individual permit applications (with fills in watersheds greater than 250 acres), compared to the 81 projects approved using NWP 21.

Currently, there is insufficient data from which to draw a scientific conclusion for selection of a particular watershed size as a threshold between IP and NWP 21 processing. The CWA Section 404 program was intended to evaluate whether or not proposed activities cause significant adverse effects to the aquatic environment. As described in Chapter II.C.6.a.1, Chapter II.C.7 Action 12, and 67 FR 2042, watershed size is not the only factor considered in making adverse effect determinations and evaluating the appropriate CWA Section 404 process for MTM/VF applications. The COE favors site-by-site functional assessments to determine the impacts of each project proposal and mitigation in waters of the U.S. Significant aquatic resources may exist in small watersheds and significantly impaired waters may exist in larger watersheds. Thus, use of alternatives setting "one-size-fits-all" thresholds *in lieu* of stream functional assessment protocols were dropped from consideration.

As discussed below in II.D.5, this EIS found insufficient scientific basis to date for restricting fill size based on type of stream segment, watershed surrogates for stream segments, past mining practice, or COE workload management. However, the 250-acre threshold established in the *Bragg* agreement could be the administrative basis for the continuing use of NWP 21 until such time as sufficient scientific data may be available to establish a specific threshold. The COE proposes in Action 9 to compile data collected through application of the stream assessment protocol to evaluate whether programmatic "bright-line" thresholds are feasible [Chapters II.C.6 and II.C.7].

d. Cumulative Impact Restrictions

A number of alternatives with restrictions for MTM/VF based on cumulative impacts to waters of the U.S. were considered and dismissed. The CWA and SMCRA require, in addition to the individual impacts of MTM/VF proposal, that the cumulative effects of multiple MTM/VF proposals also be evaluated. Cumulative impacts are discussed in Chapter II.C.7 and Action 12. The alternatives considered were based on the influence of headwater streams on the environmental resources of the watershed. The alternatives explored:

- preserving 50% of headwater streams by prohibiting fills in one out of every two first order streams;
- preserving a stream length equal to the length of stream impacted by fills;
- requiring an IP for any project with more than 4 valley fills; and
- requiring an IP for any project that would result in the loss of more than 10% of the stream length in any given watershed or CIA.

Each of these restrictions was based on the general assumption that limiting the loss of headwater streams conserves the health of the watershed ecosystem. The existing data do not show that an across-the-board cumulative impact threshold could replace case-specific evaluations of all MTM/VF and other disturbances within a defined CIA/watershed [see additional discussion in Chapter II.D.5, below]. However, the EIS proposes an action to build a database to determine if a scientific basis for cumulative impact thresholds can be identified in the future [Chapter II.C.7, Action 12].

2. Fill Restrictions Based on Identification of High-Value Aquatic Resources

Several provisions of the CWA regulatory program promote protection of aquatic resources with particularly high value. Alternatives using existing CWA program features to conserve these types of aquatic environments were evaluated and are presented below.

a. CWA Advanced Identification (ADID) of Potential Fill Sites

One alternative would have established a blanket designation of all headwater streams in the EIS study area as "generally unsuitable" for valley fills. Such designations for specific geographically-defined waters of the U.S. can be an outcome of the Advanced Identification of Disposal Sites (ADID) process in the CWA Section 404(b)(1) Guidelines [40 CFR 230.80]. Under this provision, designating a fill site as generally unsuitable in advance of a project- specific CWA Section 404 permit application is based on the likelihood that fills proposed in these areas would not comply with the CWA Section 404(b)(1) Guidelines.

This designation would not prohibit the issuance of a CWA Section 404 permit; rather, it is a presumption that must be overcome with a demonstration, through data collection and alternative analyses, that the proposed fill would comply with the CWA Section 404(b)(1) Guidelines. Such designations may be useful to: 1) prospective permit applicants in setting regulatory expectations; and 2) permitting agencies by providing site-specific for evaluation of potential applications.

The ADID process has not been used to designate a broad class of waters such as Appalachian headwater streams as generally unsuitable for fill. Because the ADID process involves exhaustive site-specific data collection and analysis, as well as thorough agency and public participation, pursuing such a designation for such a broad geographic area would not be practicable. It is not feasible to collect data and assess every headwater stream in the MTM/VF region. Without these site-specific efforts for each headwater stream, such a designation for this category of waters would be arbitrary. Consequently, this alternative was dismissed from further consideration.

However, individual ADID efforts for specific geographic areas within the study area would prove useful in the regulatory program for MTM/VF activities. Thus, the alternatives carried forward for detailed analysis include the use of ADIDs as an action in circumstances that would assist the regulatory program in protecting important aquatic resources [Actions 1.2 and 1.3]. EPA and the COE intend to explore use of this ADID approach to identify specific locations or watersheds warranting careful consideration.

b. CWA Special Aquatic Site Designation

Another alternative assessed was the designation of all headwater streams in the EIS study area as "special aquatic sites". This action would require rule-making by EPA to expand the existing list of special aquatic sites in the CWA Section 404 (b)(1) Guideline regulations at 40 CFR 230.3(q). The Guidelines currently identify aquatic habitats such as wetlands, mud flats, and riffle/pool complexes as special aquatic sites.

If an applicant proposes to place fill in a "special aquatic site," and that fill material can be placed elsewhere to fulfill the project's basic purpose (i.e., the fill is not "water dependent" as is fill associated with, for example, a boat ramp), then the applicant for an IP is required to overcome two rebuttable presumptions. The first presumption is that practicable alternatives are available that do not involve special aquatic sites, unless clearly demonstrated otherwise. The second presumption

is that all practicable alternatives to the proposed fill that do not involve a discharge into a special aquatic site would have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise.

This alternative was dismissed from further consideration based on the fact that some stream features (e.g., riffle/pool complexes or wetlands) in the EIS study area are already designated as special aquatic sites. Headwater streams in the Appalachian Highlands often exhibit riffle/pool complexes and other aquatic habitats that are categorized as Special Aquatic Sites subject to the provisions in the CWA Section 404(b)(1) Guidelines. These sites may warrant comprehensive functional assessments of the stream environment and more rigorous alternatives analyses as part of the permit application process; and the COE may rely on the results of these evaluations to deny valley fill permit applications or employ them to develop measures to minimize adverse environmental effects of those permits issued. Therefore, the designation of headwater streams as special aquatic sites (e.g., because of the presence of riffle/pool complexes) would likely have no additional regulatory effect in practice. An applicant for an IP with fills proposed in special aquatic sites would be required to rebut the two presumptions previously discussed.

c. Advance Veto

This alternative was based on a premise that Appalachian headwaters streams would be preserved in perpetuity with an "advanced veto" by EPA. The alternative was based on the presumption that all headwaters stream are of high value to the aquatic ecosystem, warranting protection. EPA can issue an advance CWA Section 404(c) veto for a specific geographic area of aquatic resources prior to the COE receipt of a CWA Section 404 permit application. EPA also has the authority under CWA Section 404(c) to veto a single COE CWA Section 404 permit during or after review. EPA vetoes can be initiated based on unacceptable significant adverse impacts to waters of the U.S., including cumulative impacts. Like ADIDs, advanced vetoes require substantial data collection, analysis, and public participation and such a designation for a broad geographic area would not be practicable as an alternative in this EIS. EPA may initiate the veto option at any time with actions unrelated to this EIS. Regardless of the alternatives considered in this EIS, EPA retains the ability to exercise its CWA Section 404(c) authority where it finds that mountaintop mining would have unnaceptable adverse effects on certain aquatic resources.

3. Fill Prohibition

An alternative to prohibit valley fills in waters of the U.S. was considered. The alternative was based on an interpretation that placement of valley fills in streams is contrary to the EPA anti-degradation policy of maintaining and protecting existing water uses. The anti-degradation policy is discussed in Chapter II.C.4.a.1. However, CWA Section 404(a) authorizes the COE to regulate fills in waters of the U.S. EPA has interpreted that the antidegradation policy is satisfied with regard to fills if the discharge did not result in "significant degradation" to the aquatic ecosystem as defined under 40 CFR 230.10(c) of the CWA Section 404 (b)(1) Guidelines [USEPA, 1994]. Moreover, the CWA Section 404 program, including the anti-degradation provisions, is inherently case specific and not amenable to a complete prohibition on fills in waters of the U.S. Consequently, this alternative was dismissed.

4. Summary of Fill Restriction Alternatives

Scientific data collected for this EIS do not clearly identify a basis (i.e., a particular stream segment, fill or watershed size applicable in every situation) for establishing programmatic or absolute restrictions that could prevent "significant degradation". The data indicate that impacts may (or may not) be linked to the presence of mining, and not necessarily related to the size of fills. The direct impact of a large fill is different than a smaller fill, but it appears the indirect effect downstream may be similar, regardless of fill size.

The chemical and biological studies conducted for this EIS and the statistical analyses of those studies document that streams with both valley fills and residences in their watersheds appeared to be impacted more than streams with only valley fills and no residences in their watersheds. Biological conditions in the streams with only valley fills represented a gradient of conditions from poor to very good; streams with valley fills and residences were most impacted. Impacts could include several stressors, such as valley fills, residences, and/or roads. Therefore, a causal relationship between the impacts and particular stressors could not be established with the available data. Further, the EIS studies did not conclude that impacts documented below MTM/VF operations cause or contribute to significant degradation of waters of the U.S. [40 CFR 230.10(c)].

The overall aquatic impacts attributable to fills is highly site-dependent and a "one-size-fits-all" fill restriction standard is not justified at this time. The CWA Section 404(b)(1) Guidelines are the substantive criteria used to evaluate the placement of fill material into waters of the U.S. and the sequence of steps are summarized below:

- site-specific inventory of aquatic resources
- prediction of project impacts to those resources
- considering upland alternatives to avoid the resources
- if avoidance is not possible, minimizing impacts
- adequate mitigation to offset the unavoidable impacts

Details on the requirements of the existing CWA Section 404 program and action proposals for rule making, development of policies, guidance, etc. are discussed in Appendix B and Chapter II.C.